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# MECHANIX ILLUSTRATED

OCTOBER
1940

Volume XXIV
Number 6

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ROBERT HERTZBERG, Editor

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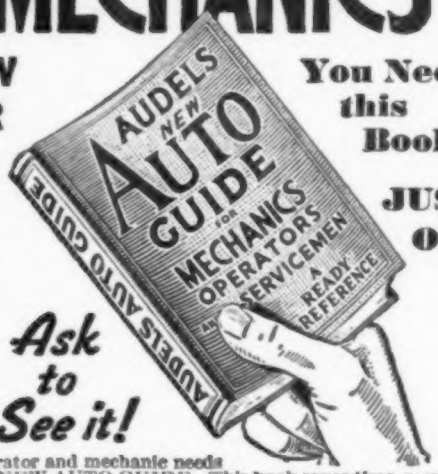


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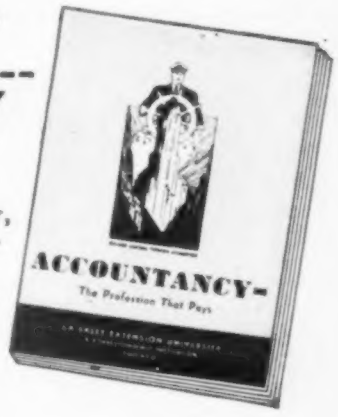


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# CHIPS FROM THE EDITOR'S WORKBENCH

**Send in photos of your completed workshop projects. Each month MECHANIX ILLUSTRATED awards a first prize of $5.00 for the best photo and letter received by this department and prizes of $3.00 each for all other photos and letters used. Be sure your name and address are clearly written or printed on the pictures. Send all such contributions to Editor, MECHANIX ILLUSTRATED, 1501 Broadway, New York, N. Y.**

## Here We Are!

WITH PRIDE, we present herewith the new and enlarged MECHANIX ILLUSTRATED . . . 162 pages for 10 cents and certainly the biggest bargain on the newsstands! How do you like it? I'd appreciate your comments, however brief. Send them to The Editor, MECHANIX ILLUSTRATED, 1501 Broadway, New York, N. Y.

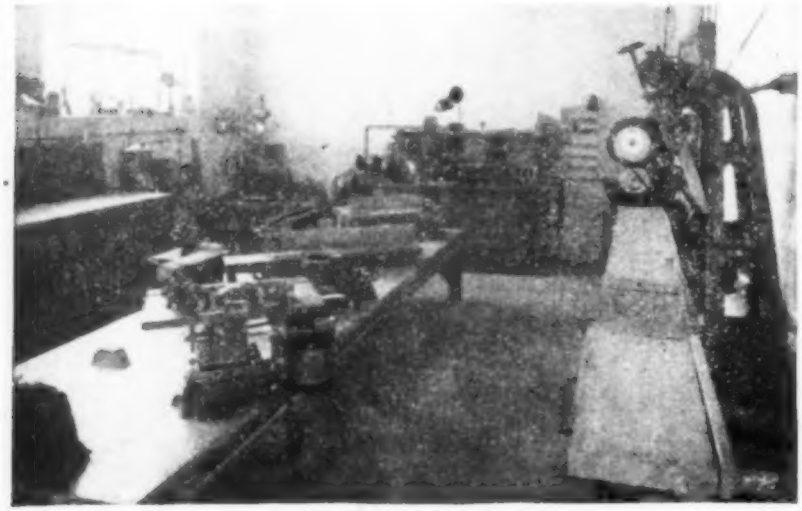
All departments have been stepped up, but the camera fans among our readers will especially notice the return of the monthly picture contest and the special photography section. Established three years ago, our photo department became so popular that it outgrew MECHANIX ILLUSTRATED itself and developed into two separate 144-page semi-annual books, PHOTOGRAPHY HANDBOOK and GOOD PHOTOGRAPHY, which are now universally regarded as the most practical, informative and entertaining photo magazines in print. The new MI department will carry on where the old one left off, and will continue to present projects and articles of interest to all photo fans.

* * *

## Drinks for Drivers

Who said that alcohol and gasoline don't mix? Here's a real surprise for motorists accustomed to well-founded warnings of the dire results of drinking before driving: A cocktail or some other alcoholic drink might make driving at night safer by improving the driver's ability to see in the dark! There's a catch to it, of course; the drinking must be done twenty-four hours previously in order to be effective. This possibility is seen as a result of tests showing the effect of alcohol on vitamin A in the body. Lack of this vitamin, obtained from such foods as butter, egg yolk and carrots, leads to night blindness.

[*Continued on page* 12]



**Strictly speaking, these pictures do not show a "workshop project," but rather a workshop itself. We're running them because we receive so many letters from readers who are curious about the layouts of other people's shops. This particular one is the property of J. Belanger, 812 South Griffith Park Drive, Burbank, California, and is unusually complete and spacious. It's also unusually tidy for an active shop; the owner probably spent an hour prettying it up for the photographer! It boasts a circular saw, jointer, shaper, sander, swing saw, wood and metal lathes, drill press, power hack saw, scroll saw and air compressor, and hand tools of all descriptions.**

**"I made my own patterns and built the swing saw myself," writes Mr. Belanger, who wins this month's $5.00 Workbench award.**

**How about sending in pictures of your shop?**

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# Chips From The Editor's Workbench

[*Continued from page* 10]

The condition is determined by special eyesight tests or by blood tests.

With the blood tests, Dr. S. W. Clausen and associates of the University of Rochester School of Medicine discovered that giving dogs two ounces of alcohol promptly increased the amount of vitamin A in their blood. The same thing happens to human beings, according to Dr. L. B. Pett, of the University of Alberta. The alcohol apparently mobilizes the vitamin A from its storage place in the body (presumed to be the liver), getting more of it into the blood for distribution to other parts of the body, including the eyes. Carrot juice will do the trick just as well and a lot more safely.

Incidentally, a good trick in night driving, practiced by truck drivers, is to shut one eye as soon as you spot a pair of bright headlights coming your way. Open it just as the other car goes by and you'll have good vision even though the other eye is completely paralyzed for the time being.

* * *

## All Gassed Up

Every once in a while a bunch of engineers in some business will get together at a convention, let their hair down and tell a lot of things that embarrass the home office boys in the sales and advertising departments no end. For instance, there was a meeting recently at Fort Worth, Texas, of the American Petroleum Institute, and it was brought out that gasoline of high octane rating, the advantages of which have been widely promoted, is no cure-all for the ills of motor car performance.

"When high-octane-number gasoline is used in a car which does not knock on the lower-octane material, no improvement in performance results," stated C. H. Van Hartesveldt and H. W. Field, of the Atlantic Refining Company. "When a car that knocks is fueled with a high-octane gasoline, the knock is reduced, but no additional power or gasoline mileage is obtained unless the knock was extremely loud. Knock must be so loud for power loss that no motorist with normal hearing, driving such a car, would fail to take the car to a repair shop. These things have been known for some time, but they deserve more emphasis than they are getting in present-day advertising."

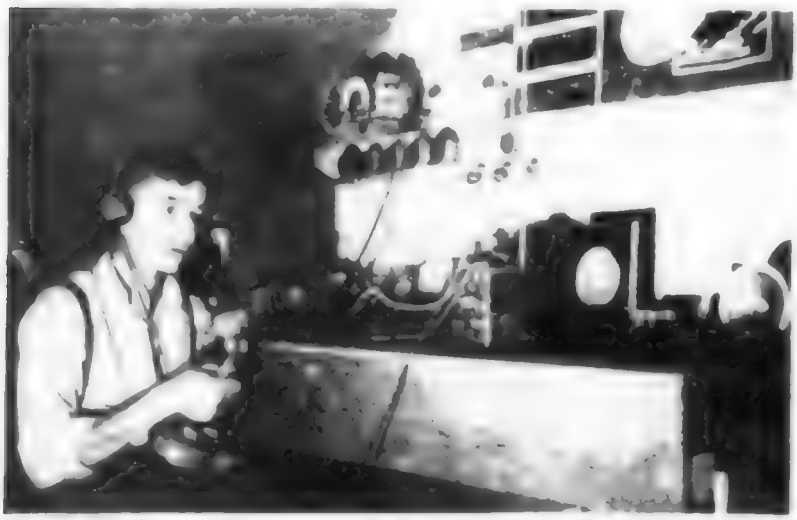
* * *

## Visibility: Poor

The above isn't a weather report; it's my personal comment on the window and wing arrangement of the Douglas DC-3, the standard transport plane universally used by domestic airlines. The ship is luxurious, spacious and comfortable, but every time I ride in one I am annoyed all over again because it affords such a poor view of the ground below. All one can see from most of the seats is a broad expanse of wing. I know that engineers favor the low-wing type of construction over the high-wing for heavy ships, but half the fun of flying is watching the countryside roll by magically beneath you.

This feature of airline flying is especially marked to a person who has flown at all in light sport ships. Recently I visited the Taylorcraft factory in Alliance, Ohio, and after lunch the boys volunteered to ferry me over to Akron to catch an east-bound transport. The Taylorcraft is a two-

[*Continued on page* 33]



"I am sending you herewith some pictures of my two favorite projects, a diving helmet and a radio workbench," writes Charles Patterino, 211 West Jefferson Street, Williamsport, Penna. "I built the helmet from scrap materials and got many ideas from previous issues of MECHANIX ILLUSTRATED. The black weights are of lead and weigh about five pounds each; there are also four more of them in the rear. An ordinary bicycle pump is used for pumping air and works very nicely."

For these two interesting pictures reader Patterino will receive a Workbench award of $3.00.

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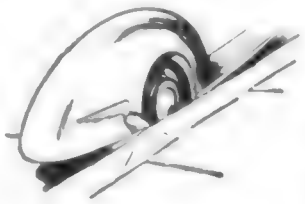
# POPULAR PATENTS

Safety devices for automobiles are well represented in patents recently granted by the Patent Office. To provide a steering wheel of such a nature that a person may get into and out of the car with ease and at the same time serve as a shock absorber in the event of sudden stops, an inventor devised a steering wheel having a flexible lower section. The flexible part is made of yielding soft rubber or in the form of a spring. In the event of a sudden stop or collision, the driver is thrown forward against the flexible lower part of the wheel, thus avoiding injuries which are due to collision with the wheel. This arrangement also simplifies the seating problem for stout drivers.

* * *

An audible signal for warning a driver when his car approaches too close to a high curb, a wall, post, or other automobile won the award of a patent. The device consists of a pneumatically operated switch mounted on the sides of the front and rear fenders of a car. The switch is shaped like a bullet and protrudes from the fender. When the protruding part contacts a curb or any other object an electrical circuit is completed. The circuit includes a signaling device such as a light, buzzer, or horn which warns the driver in time to prevent damage of his car. The invention is designed particularly to assist in parking along-side an interfering high curb.



* * *

Additional patents designed to increase safety for automobiles include a windshield mounted on lazy tongs, and a pneumatic bumper which extends around and on top of a car. The safety windshield in closed position is in the normal position of the usual windshield. In the event of a sudden stop, which throws an occupant of the car against the windshield the windshield moves outwardly on the lazy tongs. The device prevents windshield breakage as well as injury to car occupants.

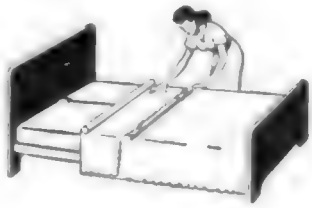
The pneumatic bumper consists of elongated tube sections which, like tires, can be inflated through a suitable valve. The bumpers protect the front, rear, sides, and top of an automobile.

* * *

The original submarine was patented and built and used in 1776. The device is said to have had a boring device for drilling a hole in the keel of an enemy vessel.

* * *

A bedspread that rolls like a window-shade is the subject of a recently granted patent. In use, one end of the spread is fastened at the foot of the bed. The roller which holds the remainder of the spread is rolled toward the head of the bed and the roller is secured at the head of the mattress. To roll the spread when the bed is to be used the roller is permitted to roll up the spread under the action of the spring to the foot of the bed. This new type of roller-spread is said to eliminate wrinkling and also permits the spread to be placed by a single person from only one side of the bed.



* * *

The average time between the filing of a patent application and the issue of the patent is about three years.

* * *

A false face of enormous proportions is furnished by a novel inflatable mask which is provided with cheek pouches and ear pouches and a nose pouch. These pouches are all connected to a valve held in the mouth of the wearer. The valve is adapted to hold the false face in an inflated condition. By a mere movement of the mouth, the valve operates to release the air pressure in the face.

* * *

Patent 1,028,501, on an auto part, was issued 33 years after the original application was filed in the Patent Office.

[*Continued on page* 16]

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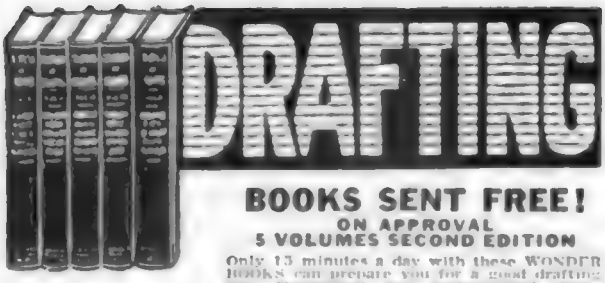
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# Popular Patents

[*Continued from page* 14]

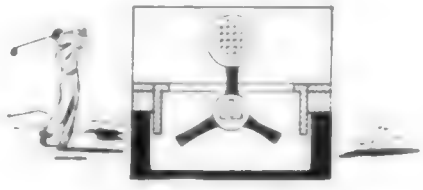
A new wrinkle is very definitely associated with a newly patented illuminated hat. In fact it is the wrinkling of the forehead of the wearer that operates an electrical switch for lighting the novel hat. The hat is provided with a transparent advertising panel. Behind the advertisement is located an electric lamp connected to a dry cell battery located in the top of the hat. A control button mounted on the inner surface of the hat visor is movable merely by a wrinkling movement of the wearer.

* * *

Models of inventions are not frequently required by the Patent Office. Drawings usually are sufficient. However, a model may be required to prove that a new device is operative.

* * *

A permanent golf tee which can not be lost in the grass, and which always supports a golf ball at a uniform distance above the ground should be a welcome addition to any golfer's equipment. The newly patented golf tee has a spool-shaped portion having several extending fingers adapted to hold a golf ball. The fingers are of different lengths and are provided with a cup shaped recess in which the ball may be set. The spool rotates on a shaft set in a support which rests on the ground. Each finger has a distinctive color so that a player, by selecting the same colored finger for each tee-off, is certain to have the ball supported at the same height above the ground. When the ball is struck, the spool rotates in the direction of the flight of the ball. A choice of ball height is permitted by the variation in the lengths of the several fingers.



* * *

Include in your famous people who were inventors Benjamin Franklin who invented the bifocal eyeglass lens and Thomas Jefferson who invented the swivel-chair.

[*Continued on page* 19]

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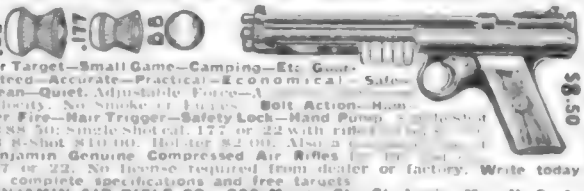


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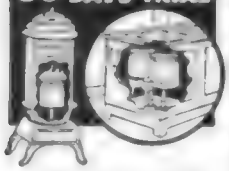

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Dept. 2357, Chicago, Ill.

# Popular Patents

[*Continued from page* 16]

Other recent patents include a frying pan with a hollow handle to hold grease or oil for frying . . . a private toilet chamber for animals kept indoors . . . a coaxer dish to encourage children to eat. The dish has a rotatable bottom which displays pictures which may be seen when the food is eaten . . . A key and lock combination painted with light-emitting paint to assist in inserting the key . . . A frying pan that produces bacon without curling . . . and a sun hat which folds up like a fan when it is not in use. A comb with detachable teeth and a shower which also sprays perfume with the water received patents.

—*By Morton Leese*

* * *

## Patents Identified

| | |
|---|---|
| Steering Wheel | No. 2,204,070 |
| Curb Signal | No. 2,201,496 |
| Windshield | No. 2,200,936 |
| Pneumatic Bumper | No. 2,202,460 |
| Golf Tee | No. 2,202,556 |
| Illuminated Hat | No. 2,203,028 |
| Bedspread | No. 2,202,582 |
| False Face | No. 2,203,562 |
| Frying Pan | No. 2,204,467 |
| Dog Toilet | No. 2,204,416 |
| Coaxer Dish | No. 2,200,696 |
| Key and Lock | No. 2,201,127 |
| Bacon Fryer | No. 2,200,335 |
| Sun Hat | No. 2,200,783 |
| Comb | No. 2,202,089 |
| Shower | No. 2,201,528 |

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## Niagara Gets A New Bridge

An architect's drawing superimposed upon an actual photograph of Niagara Gorge taken from Horseshoe Falls shows how the Gorge will look when the new Rainbow Bridge, replacing the "Honeymoon" Bridge destroyed by ice in 1938, is completed next year. The huge $4,000,000 arch span, the longest of its kind in America, will measure 950 feet from the American to the Canadian side of the River. Well above the mark of the highest ice-jams on record, the span will be safe from the sort of tragedy that wrecked its predecessor. With two twenty-two-foot roadways, it will provide a convenient and scenic crossing. A wide promenade for strollers on the southern side of the bridge will take advantage of the unobstructed panorama.


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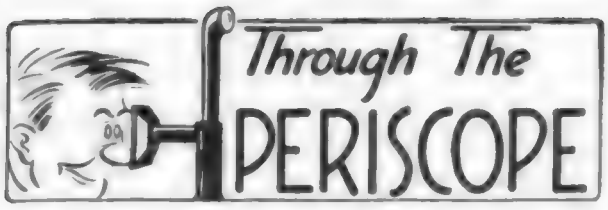


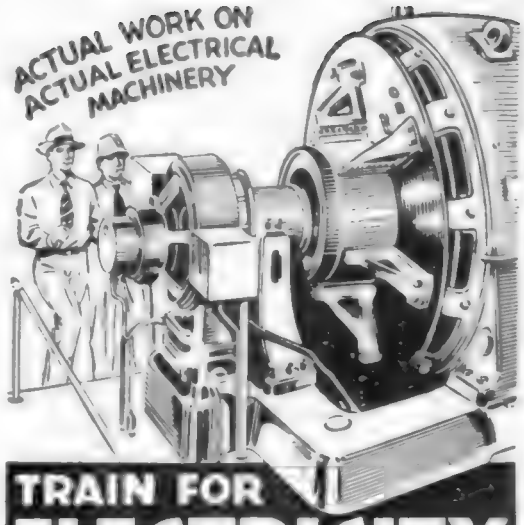

Ernest P. Walker, assistant director of the National Zoological Park in Washington, has a pet wild mouse that chews tobacco. Not only chews it, but spits it out, too! The little animal, a grasshopper mouse, lives in a cage on the corner of Mr. Walker's desk in his home. His name is Ony—short for his full zoological title, Onychomys leucogaster, which is a pretty long handle for such a tiny creature. Every evening he is let out of his cage for a few hours of liberty.

"Frequently I have noticed," reports Mr. Walker, "after he had been running about the desk, that very small cigar stubs which I had left in the ash tray had been carried to his favorite location on the desk and completely demolished.

"My first thought was that he was merely amusing himself; but this explanation did not satisfy me. Recently I offered him one of my small cigar stubs after he had been without such material for a short time. He took it immediately, carried it to his favorite corner and took a small

[*Continued on page* 22]

"Down in the basement is my husband's workshop—I think he's making a boat."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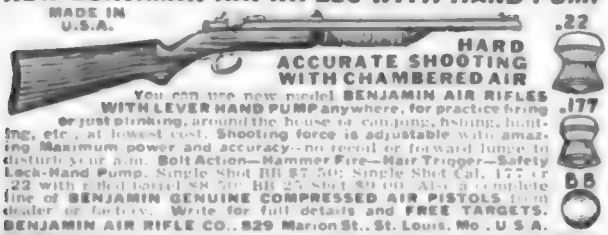


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## MONEYMAKERS AND MONEYSAVERS

(Pages 27-32)

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# Through The Periscope

[*Continued from page* 21]

bite from the end I had held in my mouth. He chewed the morsel briefly and then bent around, separated his fur with his hands and placed the chewed tobacco at the base of the fur. He took another bite, chewed it briefly and placed it similarly. He did the same thing at various parts of his back, thighs and underparts. This procedure has since been witnessed by both my wife and myself and by visitors on several occasions.

"When I first noticed that he had used the tobacco in this manner, I wondered at the instinct or reasoning that prompted him to do so. Mr. Vernon Bailey, who gave 'Ony' to me, reminds me that two species of wild tobacco normally occur in the general range of this grasshopper mouse. It's quite possible that the use of tobacco as an insecticide is a normal but heretofore unnoticed habit of the species."

* * *

Did you ever hear of a gandy-dancer, a hot-stuff man, a bull runner, a frog-leg assembler or a vamper?

You may have your own ideas as to what these people do, but the odds are that you're wrong. Actually, they are occupational titles in American industries, included in the compilation of such titles in the "Dictionary of Occupational Titles," developed after years of study by the U. S. Employment Service. Each industry has developed its own names for its own jobs. Many of these workers are duplicated in other industries under other names, yet the same name may be applied to different jobs in different industries.

A "peeler" has the most famous of all the jobs in the Army when he is put on K.P. with the potatoes. But a "peeler" in the amusement industry is a strip-tease artist. In a sawmill, a "peeler" takes the bark off logs and may also be called, believe it or not, a "spudder."

[*Continued on page* 25]

"Just a little precaution against waking and finding the car gone."

## Through The Periscope

[*Continued from page* 22]

A frog farmer actually raises frogs for food, but a frog-leg assembler works on the inside of automobile doors. A bull runner is a pourer in a foundry. A gandy-dancer is a trackman in the construction industry. A hot-stuff man, also known as a shake-out man, is the fellow who dumps hot pans in a bakery. And a vamper is the romantic sounding name for the person who stitches together the uppers, in a shoe factory!

* * *

Air conditioning engineers report that even the finest tobacco smoke particles can be effectively removed from the air by "electrocuting" and trapping them on charged plates with a newly developed device known as a precipitron. A few lighted cigarettes can quickly fill a room with smoke, but the particles are so tiny that it takes 320 cigarettes—16 packs—to make one ounce of smoke particles.

—*Cliff Taylor*

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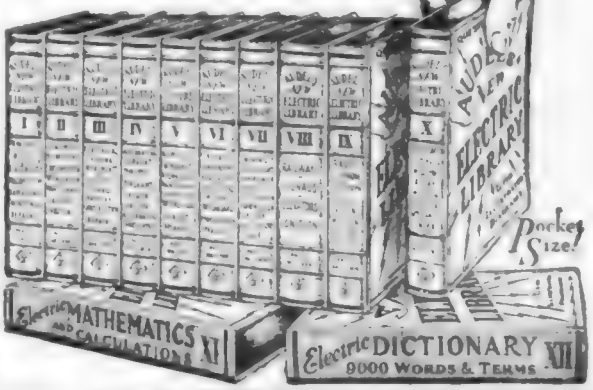


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# Editor's Workbench Chips

[*Continued from page* 12]

place, side-by-side job with high wings. The trip to Akron was marvelous, although it lasted only fifteen minutes. I could look up, down and sidewise, and I had a most unusual glimpse of the specially-built road at the edge of the Akron airport where the Chevrolet Soap Box Derby is held every year. I stepped from the trim little Taylorcraft into a giant DC-3, and from then until we landed at La Guardia Field, New York, I might as well have been riding in an elevator. Fast transportation, yes, but I'd have enjoyed it more if I could have snapped a few pictures of the mountains and of the World's Fair.

* * *

## Flying Fun

Even though a light sports plane costs only about as much as a medium heavy car, it's still something of a financial burden to a chap earning a moderate salary. However, if two men share both the initial cost and the upkeep, the expense per man is quite reasonable. If three or four or five flying enthusiasts get together and form themselves into a little club, they can all learn to fly and get in plenty of hours at the controls for hardly more than cigarette and movie money. There's the answer to a question that keeps popping up in our mail all the time, "How can I learn to fly cheaply?"

The next problem is finding your prospective

[*Continued on page* 139]

This garden tractor is a rather queer looking hybrid, but it saves a lot of work on the part of Walter W. Gillett, of Fairmont, West Va., and wins him a $3.00 prize. He describes it as follows:

"The frame is made from angle iron from old bed rails. I used a Model T Ford differential and discarded the housing and cut off the axles. The spider gears in the differential enable the tractor to make sharp turns. I removed the ring gear and mounted a 14-inch gear wheel in its place. For the clutch I used a gear box from a washing machine. The engine is a ¾ h.p., four-cycle unit. The clutch lever and the throttle are on the handle bars."


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# Secrets of the NAZI PARACHUTE ARMY

by Carl Nohle

**History alone can tell us just how important a part in Germany's incredible "blitzkrieg" victories was played by the dreaded Nazi parachute troops. The world may not yet realize exactly how much these "suicide troops" had to do with the ultimate victories of the German army.**

**The author of this article, a member of the Nazi parachute army, was captured by British infantry shortly after the offensive into the Lowlands began, and is now interned in Canada. He answers here the questions that we all have asked ourselves: How are parachute troops trained? How equipped? And just what do they do after they have landed?**

**It's something that every American should read!**

**—THE EDITOR.**

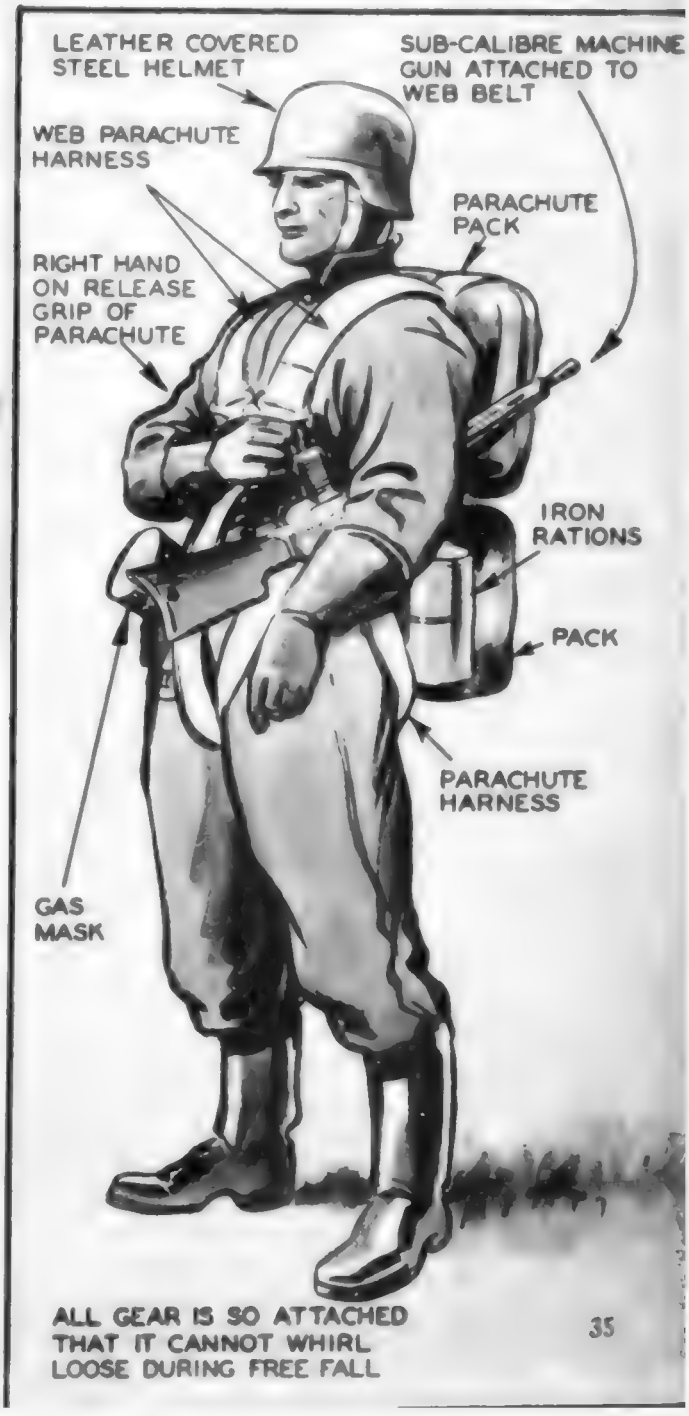
*Left:* A Nazi parachute trooper shown after being dropped from a transport plane into a strategic position during maneuvers. He is equipped with gas mask and full fighting equipment.

IN THE eerie greyness of early dawn we stood at ease in front of the plane which was to carry us over Belgium and received final ground instructions from our group commander.

It was the morning of May 15, just four days after our Fuehrer had ordered his armies into the Lowlands, and each one of us looked forward to his own personal "zero hour" with grim determination. To the right and left of the plane which was to carry us were other planes, fifteen in all, lined up outside the great underground hangar, not many miles west of Coblenz; in front of each plane were groups similar to ourselves, receiving their last minute instructions before taking off.

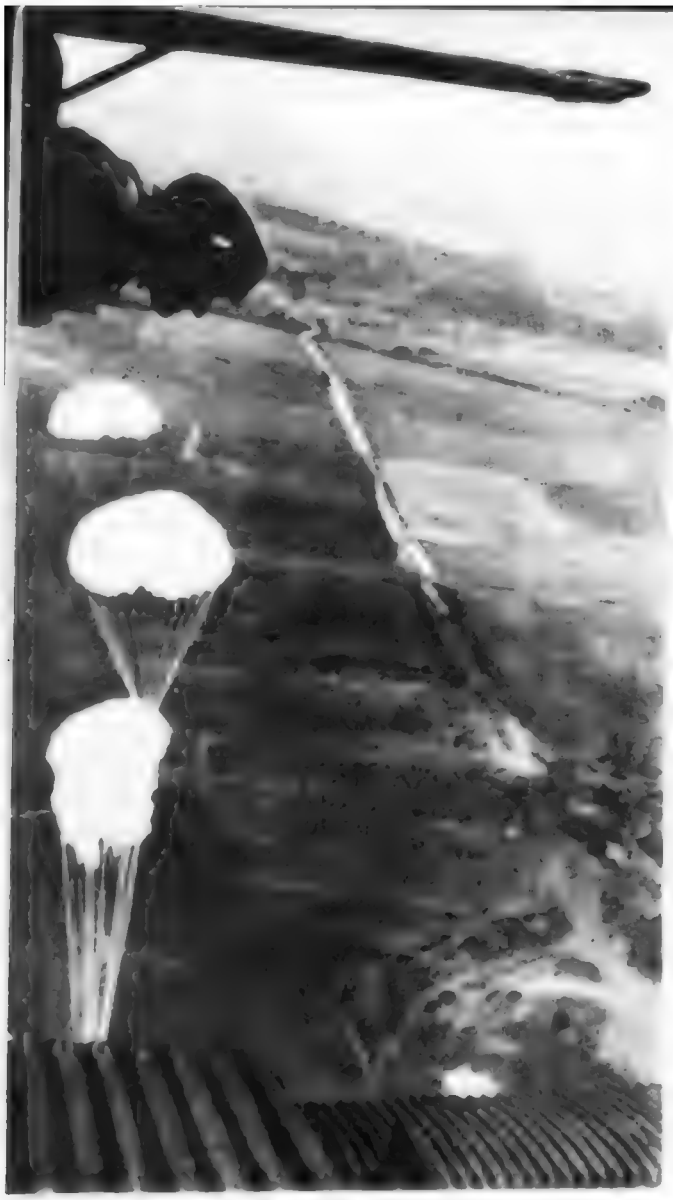
Looking at the groups of men before each plane, as well as my comrades in our group, I wondered how many of us would ever see Germany again. Few, I was sure. Yet this was the moment we had all been waiting for, this was the day that would find us dropping down from the skies, not on practice fields in Silesia and conquered Poland, but behind

Our artist's conception of parachute troopers falling from a German transport plane. So that the men are not too widely scattered after landing, opening of the 'chute is delayed as long as possible, after which it is guided by "spilling" the air from it as desired. Below: Diagram shows how the Nazi parachute trooper is equipped.




enemy lines to face death for our Fatherland and Fuehrer. Every man among us knew how apt was the term "suicide troops" so often applied to us. Our duty was to outwit the enemy, to disrupt his communications and supply lines and to break his morale by sudden and unexpected behind-the-lines sorties, thus paving the way for a successful break-through by our panzerdivisionen (mechanized troops).

Behind us, mechanics of the Air Force had started up the engines of the planes which



Above: This photo, taken by an official German army photographer, shows a parachute trooper about to make his leap from the plane. Several of the men have already bailed out at one second intervals, and their parachutes blossom out below the plane. Below: Nazi parachutists leap toward a container of war apparatus, dropped from a transport plane.

were to carry us over enemy territory. The planes were Junkers, of the "JU 52" type, used before the war as civil passenger airplanes, and now pressed into service as the standard troop-carriers of the Air Force. The roaring din, as the fifteen tri-motored ships warmed up, was deafening.

"You will make a final check of your equipment and rations immediately!" our commander shouted. I went over my equipment carefully. First, the parachute harness, of powerful web belting, which went over each shoulder, around both thighs and was held tight by the cross-chest strap and powerful waist belt. The chest, waist and thigh strap hooks were secure. I motioned for a comrade to check the back of the harness, and the parachute pack; after he had tugged and inspected it, he turned and I did the same for him. Quickly I went over the rest of my equipment. Gas mask, knapsack, binoculars, spade, short bayonet, sub-calibre machine gun, clips of ammunition—all were in order, securely attached so that nothing could whirl loose during the fall through the skies. My iron rations, consisting of concentrated foods, soy beans, chocolate bars, dried fruit and sausage, and anti-fatigue pills, were in good order. My leather-covered steel helmet was fastened securely by both front and rear straps. I was ready!

Our commander looked at his wrist watch. Unable to make himself heard over the din of the roaring motors, he pointed to the plane, then walked back under the wing to the door, as we followed him. Moments later, we were inside the plane, sitting facing each other across the narrow aisle. There were sixteen

of us, including the commander, and we had been drilled as a unit for months in the severest training course in German military history. In isolated sections of Silesia, in eastern Germany, and in parts of conquered Poland we had prepared for this day. We had practiced jumping, sometimes as many as five jumps a day, over a period of months, with especial concentration on "steering" our 'chutes so that we would be concentrated as a group when we landed. After the landings, we had practiced setting up our big machine gun, which was brought down in three parts, and making for the nearest strategic spot of ground to defend ourselves in case there was a "reception committee" coming to greet us. We had spent weeks learning ground tactics, how to capture and hold such strategic objectives as railroad stations, radio transmitting stations, secondary defense posts; we became adept in the art of dynamiting railroad tracks and supply roads.

Looking out of the plane windows, we saw the first plane in line move out, swing around and roar down the field. Then the second. We were the sixth in line, and in a minute or so we, too, were roaring down the field, and then suddenly we felt the earth fall away from the plane wheels. Looking back down at the field, we could see the other planes following, while ahead and above we could see the planes that had preceded us climbing into the murky grey of the early morning sky. It was not yet five o'clock.

We had more to do, however, than enjoy the scenery, or what we could see of it. Our commander had given us our instructions, and now we followed them. Each man re-

In the picture above, one of Germany's swarm of human locusts is shown poised ready to leap from a transport plane. Despite their youth, these parachute troopers are well-trained and amazingly versatile.

Below: These men have discarded their parachutes, assembled their heavy machine gun, and are dashing for the protection of a high railway embankment.

moved from the zippered shoulder pocket of his waterproof jerkin a small map, in an isinglass holder. Our orders were to study this map carefully, for it was of the particular part of the Belgian countryside to which we were assigned. On it, hills, valleys, woods, creeks, roads and possible fortifications were carefully delineated. Poring over the map in the semi-darkness inside the plane, I knew that if we didn't know where we were when we landed, it would be no fault of the German Intelligence which had so carefully prepared it.

All the while we had been climbing, and now, glancing out of the window, I saw that we were well above the earth—my guess was around 4000 feet—and roaring along at probably 125 miles an hour. The dusky haze of dawn made it impossible to recognize any landmarks on the ground, which was just discernible, and no more, but we knew that to our pilot, a veteran of civil transport service the terrain below us was an open book. Just as we had been trained to know our duties, so had he been trained to deliver us at the right place.

We roared through the air for what seemed like days, but what was actually a little over an hour

Above: Nazi parachute troopers undergo a period of intense training. Here one of them is about to jump from a raised platform in the training school. The belt rope is hitched to a pulley suspended from the roof.

Right: Having leaped from the platform, the student trooper now learns the fundamentals of correct landing. The success of the Nazi parachute army is attributed to the thorough training given to each man.

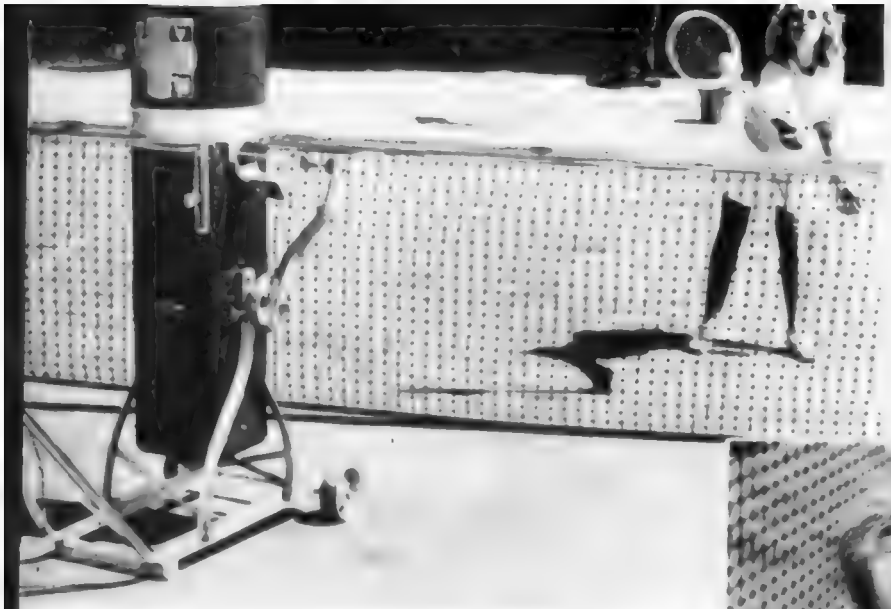
Our commander, after consulting his watch, stepped forward to speak with the pilot. Turning back from the pilot's compartment, he addressed us: "Be prepared to jump; we are nearing our objective." I made a hasty recheck of my equipment, made sure that my parachute release cord was free, then relaxed, waiting for the order that would send me, along with my comrades, hurtling down toward a hostile earth. Looking at them sitting beside and across from me, calm determination written on every face, I found it hard to convince myself that they realized, just as I did, that we all might be dead within the hour.

Our ship was dropping rapidly. The commander nodded to the two men nearest the rear door, and they arose and swung the door back into the ship and fastened it. The commander walked back to the door, and looked out, as the plane circled. He looked back over his shoulder, nodded, and then was gone. What followed was like clockwork. Each man stood, walked quickly to the door and leaped, jumping as far as possible from the ship. There could be no loss of time between the leaps, as we all were to do our best to land as a unit. Following the commander went the three men carrying the machine gun in three parts, tripod, firing mechanism and barrel. Seated near the front of the ship, I was one of the last to leap, yet it was probably less than a minute after the commander had jumped that I stepped to the door, crouched, and threw myself out from the plane. Below me I saw open 'chutes, and 'chutes in the process of opening, like gigantic white flowers; I pulled at my release cord with gloved hand, and seconds later felt the satisfying yank at my harness that told me the wind was in my 'chute.

Looking down, I could see that several of my comrades had landed. Almost mechanically, after months of practice, I manipulated the shroud lines with my gloved hands in order that my drift would be toward the spot where the commander had landed. As I neared the earth, I saw that the spot selected for our landing was a great open field, almost completely surrounded by trees; it would be difficult for the enemy to take us unprepared unless they had been waiting for us. As I

[*Continued on page* 138]

One of the first lessons given to the parachute troopers is the proper care of their 'chutes. Here we see a group of student parachutists inspecting the lines of their parachutes.



## Mechanical "Tilden" Has a Wicked Serve!

THE pretty girl at the left is returning the tennis ball shot at her by the machine in the foreground. The mechanical marvel is used by William White, professional at the Merion Cricket Club, near Philadelphia, to aid in the training of tennis pupils.

## A Couple Of Good Skates

DESIGNED for use in the country where there are no sidewalks or paved roads, these skates were invented by Hank Breuninger, of Los Angeles. Operation is simple—when the wearer wishes to skate, he turns up his toes and sails along in great style. When he wants to stop, the toes are turned down, as shown in the picture.

## Tune In On A Few Toes

THIS vaudeville team has music in their fingers and music in their toes—both electrified. Units similar to those used on their guitars are placed in the heels of their shoes. Taps are picked up and come through the amplifier, sounding like fifty tap dancers in perfect rhythm.

## "Telemobile" Aids The Sport Fans

THE little colored boy seems to be enjoying the view from a booth in the new "telemobile." Really a modern bus divided into phone booths and connected to the regular telephone lines, the machine made its debut recently at a prize fight at the Yankee Stadium. When any location acquires national news importance the bus brings extra phones.

## Helping The Fish Raise Families

DELICATELY controlled water temperature, oxygen content, and pressure, make possible the transfer of 500 small mouthed bass to their special hatchery for stocking streams. The "iron lung" in which they travel is at the lower right. The fisherman at the left is holding one of the net-caught females. Removal of natural hazards aids fish.

# Business HUMS At This Bar!

B. F. Tucker, right, looks over the progressive steps in the building of a keg bird-house.

THOUGH situated far from the crowded centers this "cocktail bar" counts its customers by the thousands. At the rush hour—twilight, as many as five hundred patrons come at one time. There is a lot of crowding and brushing of wings, but no gaily-colored plumage is ruffled. The customers are a peculiarly silent bunch, only the drone of tiny wings, moving with the speed of an airplane propeller, breaking the stillness. The dominant idea seems to be to get a drink, or several, and start homeward. The Calliope, the smallest of the humming birds, appears the most eager. These tiny sprites, less than three inches long, are fond of high altitudes. To reach their nests, often as high as eight thousand feet in the mountains, before dark, they must hurry.

Mr. B. F. Tucker, a retired business man, is the owner of this unique bar, which fronts his summer cabin in Santiago Canyon, near Orange, California. Twelve hundred pounds of sugar, dissolved in boiling water, make up the five hundred gallons of nectar which he serves to the hummers each year.

From Mr. Tucker's fondness for the gaily-

[*Continued on page* 141]

Below: A section of the nectar "cocktail bar" at Santiago Canyon, in California. Below, right: A close-up of two "customers" enjoying an afternoon snack.

## Shoot 'Em Down And Put 'Em Out

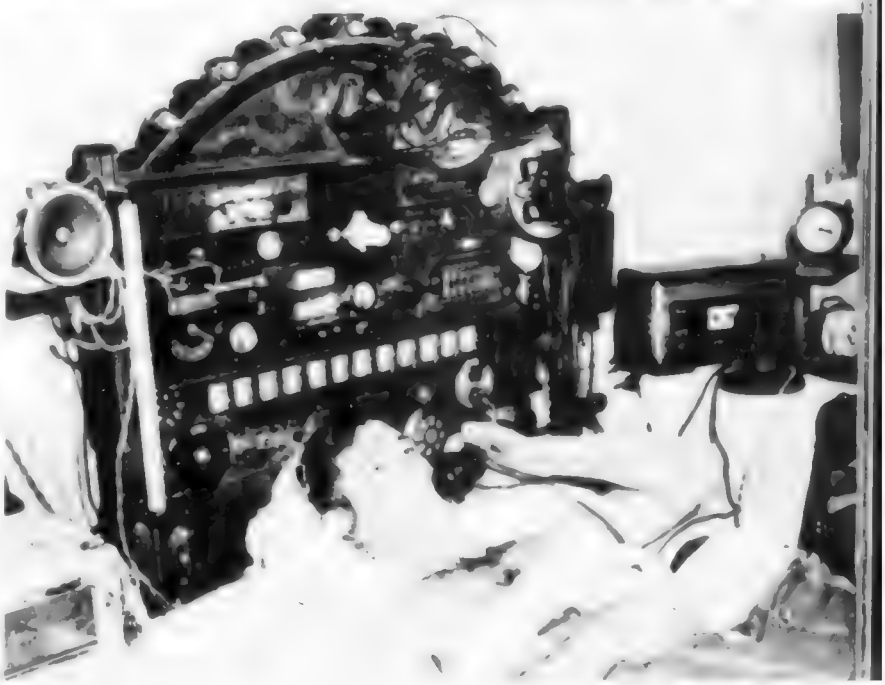
WHEN this Boston fire truck isn't putting out fires it can go out in the country and shoot at clouds for bomber-busting practice. A squad from the 211th Coast Artillery instructs the members of the fire department in the operation of the antiaircraft gun mounted on the rear of the truck. The first fire truck conversion of its kind in the country, it demonstrates the methods that could be brought into play for defense in a national emergency.

## Wind-charged Battery Runs This Car!

THE gasoline shortage in Denmark has led to a number of unusual substitutes. This one, being pointed out by its inventor, Thorvald Ellehammer, is a battery-driven car. The little automobile will run 80 kilometers on one charging. Whenever the car is not in use it is recharged by a windmill. The gadget just beyond the inventor's finger is the main fuse of the car's electrical power system. At the left of it is the variable resistance to control the speed of the car.

## Under Cover Man —Modern Style

DOUGLAS ARNOLD, of Saunderstown, R. I., is relaxing. The headboard of his bed looks like the instrument panel of a transport plane but it enables him to spend more time comfortably snuggled under the covers. Switches and controls within arms reach open and shut the windows, adjust shades and bedcovers, turn off the alarm clock, run the cooling fan, and do other odd jobs.



# Fooling The Fishes

Dick Miller, internationally famed angling expert, grins happily over a catch of trout.

DICK MILLER has broken more world records than any other man in a single line of sport. He can cast a fly over 200 feet, holding the world record with an official cast of 202 feet. He holds five world records in different casting events, has broken twelve, and holds championships in more association meets than there is room to mention here.

A resident of Huntington Beach, California, Miller is employed by the Southern Counties Gas Company; his casting and related activity has been done only in his spare time. Strictly amateur, Miller has won everything in the way of prizes from $150 trout rods (the last one of which he sent to President Roosevelt) to $2500 cabin cruisers. He turns all his prizes over to his club, the Huntington Beach Casting Club, which, chiefly through Miller's efforts, is one of the finest organizations of its kind in the country.

Unlike many tournament casters, Miller can also catch fish, for he makes every trick of his casting skill serve him in practical angling. His superior skill as a fisherman is not only recognized by those who know him, but is so generally accepted that when Warner Brothers recently sought the outstanding angler of the country to star in a fishing picture they chose him.

Several times each year someone says to Miller, "What's the good of being able to cast all that distance? It isn't necessary in order to catch fish."

He admits it, and then takes the skeptic to the trout streams and catches fish "where there aren't any," and the doubter returns willing to spend the rest of his life if necessary to learn how he does it.

Unlike most expert anglers, who disdain amateurs and divulge their secrets to nobody, Miller tells them. He not only tells them, but shows them, for he devotes his spare time to giving free instruction in the casting club which he organized. Strictly an amateur—the war in Finland prevented him from representing the U. S. in the Olympic Games—he has the true sportman's unselfish attitude, and is always eager to help others get

# with Science and Skill!

by Ralph Baker

Correct grip as illustrated by Dick Miller. Note relaxed grip and flexible wrist position

Anyone can catch fish when they're biting. The real fisherman is the one who can "catch 'em when they ain't." Dick Miller, world-famed angler, lets you in on some of his secrets!

the same pleasure from the sport of fishing that he does.

Well, what is his secret? There isn't any, says Miller; just casting skill and a thorough knowledge of the habits of fish and insects. That's all there is to it. "Anybody can catch fish when they're biting, but it's when they're not that the difference between a good fisherman and a poor one is shown. Many good anglers believe that when trout aren't biting you might as well fold up and go home, but that's not so. That is," he adds quickly, "if you know how."

The following incident, typical of experiences which have happened dozens of times, illustrates the point. Miller went with a party of experienced fishermen early last spring to the headwaters of the Owens River in the California Sierras. The weather was cold and windy, the streams swollen, the trout dormant. At the end of the first day the old-timers had seven fish among them, and thought themselves lucky; Miller caught the limit in two hours.

*October, 1940*

A close-up of Miller, ready to begin the cast. Fingers of the left hand are used to guide and pull the line, which runs between the second and third fingers.

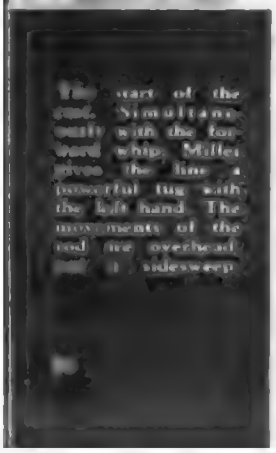
It seems simple, either to hear him tell it or see him do it, but back of his success are years of angling, experimenting, study of insect life, and laboratory research, all devoted to finding the answer to why they bite or don't bite, and because he knows what he is talking about, his opinions on the subject are valuable to other anglers.

First, he says, a good trout fisherman must know how to cast correctly, the objectives being accuracy in placing the fly, skill in handling the line, avoidance of arm fatigue, and ability to imitate the movements of a real fly.

Whether you are a beginner or an experienced angler, the best way to learn or to improve your casting is to join a casting club, he believes. These clubs can be found everywhere nowadays, and membership fees are trifling, often only two or three dollars a year.

"It's not unusual to see an angler double his catch," says Miller, "after a season in a good casting club. The correct casting fundamentals are taught, faults which the individual cannot see himself are quickly spotted and corrected, the habits of fish and insects are studied, and fishing tips are passed about among the members. It does not matter

At the beginning of the backcast, Miller gives the line a powerful pull with the left hand, at the same time shipping back the rod. This double pull, his own invention, enabled him to better the world record for casting many times.



The start of the cast. Simultaneously with the forward whip, Miller gives the line a powerful tug with the left hand. The movements of the rod are overhead and a sidesweep

how much you know, you can always learn more. Professional guides who certainly know their fishing come to our club every season from as far away as Canada for instruction in casting. They know that improved casting means more fish.

"After the correct fundamentals have been learned, that is, grip, power application, and rod movements, the technique that best suits the individual can be worked out. No two will be exactly alike except in fundamentals.

"Next, after learning how to handle the equipment properly, getting the feel of rod and line, the various types of casts may be taken up. The roll cast, for example, enables you to get the fly out when there is brush or some obstruction behind. The steeple cast shoots the line upward and then out, and is handy for getting through brush in front.

"While great distance is not essential, there are times, such as in lake or salmon fishing, when it is mighty desirable. If, however, you can handle a fly well at long distance, you can handle it much better and easier at a shorter distance."

The unique feature of Miller's technique which he worked out himself, not only enabled him to better the former world record by about 50 feet when he introduced it, but offers decided advantages in actual fishing It consists of a double pull on the line with the left hand while falsecasting. A hard jerk is given the line just at the beginning of the forecast, and another at the start of the backcast. This gives an additional snap to the line, adding greater power, causes a narrow loop, and keeps the line on a single plane always in the air, never touching the water in the whole falsecasting. The fly always drops down from above, the line is kept out of the fishes' window, and is whipped dry with every cast

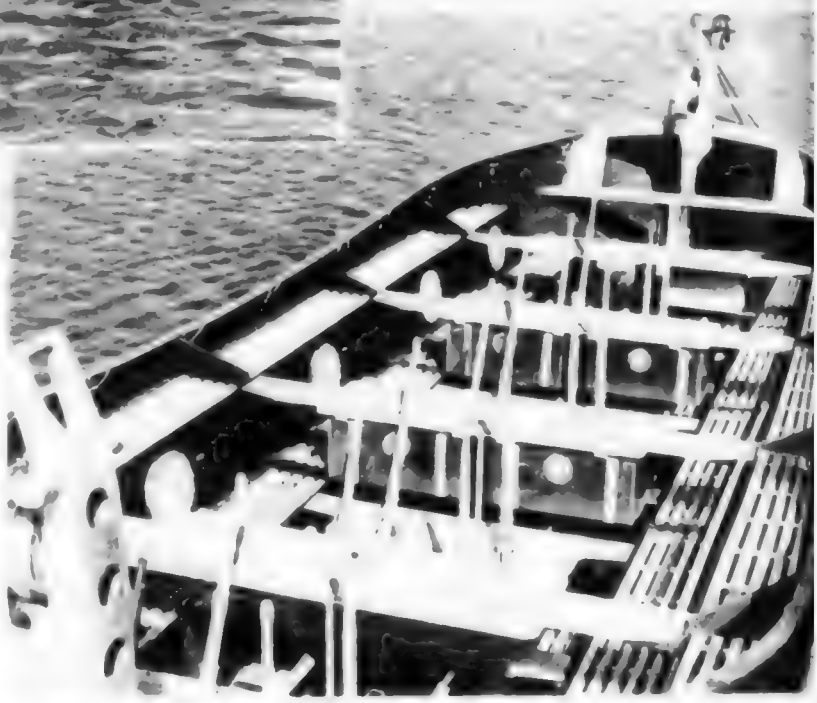
[*Continued on page* 140]

Dick Miller ties all his own flies in this corner of his Hobby House. His equipment includes every fishing supply.

The final cast. Note the long length of line and the narrow loop as it starts its flight over the pool. Miller can cast a fly over 200 feet; at 150, he can drop a fly in a 30-inch ring.

## New Lifeboat Is Propelled By Levers

PACKED with almost a hundred happy-looking passengers, one of the revolutionary new lifeboats of the U. S. liner *America* takes a trial cruise. Having a maximum speed of six miles an hour, the boat uses a novel, manually-operated system of push-pull levers, as shown below, instead of oars or motor. From one to sixteen people can operate the levers.



## Grass Doesn't Grow On A Busy Head!

BUT if the head isn't busy, then it's an entirely different matter. Proof of this, a porous clay head recently placed on the market has grooves cut in the head in which grass seed is placed. The head, filled with water through a hole in the top, soon sprouts a luxurious growth of grass hair, as shown below. There are grooves for grass eyebrows.

## It's A Finny Costume!

MAJOR EDWARD SCUDAMORE, of the Canadian Reserve, is shown wearing the hunting and fishing costume which he demonstrated recently in New York. It consists of an air-filled tube, with a seat for the wearer and a tin fin for each leg. Used by fishermen and duck hunters, it is a life saver.

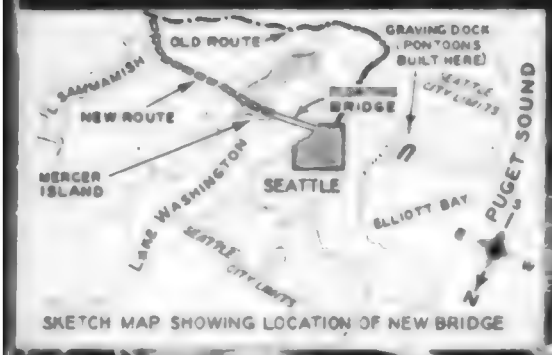
## Odd Mask Keeps Dust Out

ERNEST NORDEN, San Diego, California aircraft worker, looks ominously out from behind his strange mask. The mask is a special kind, used to prevent fine metal dust from entering his lungs while he grinds out metal drop hammer dies.

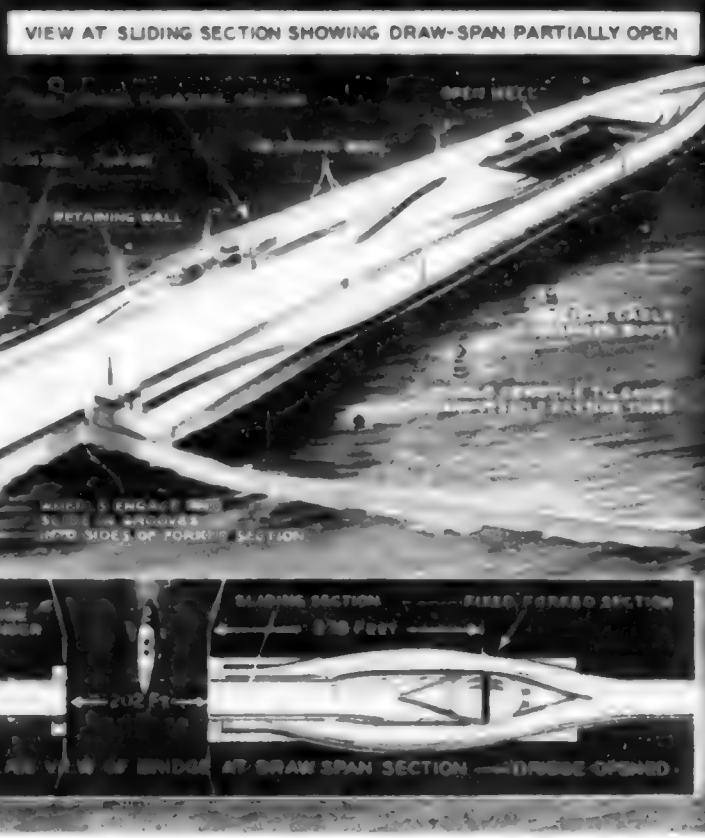
## Pilot's Emotions Are Sweated Out!

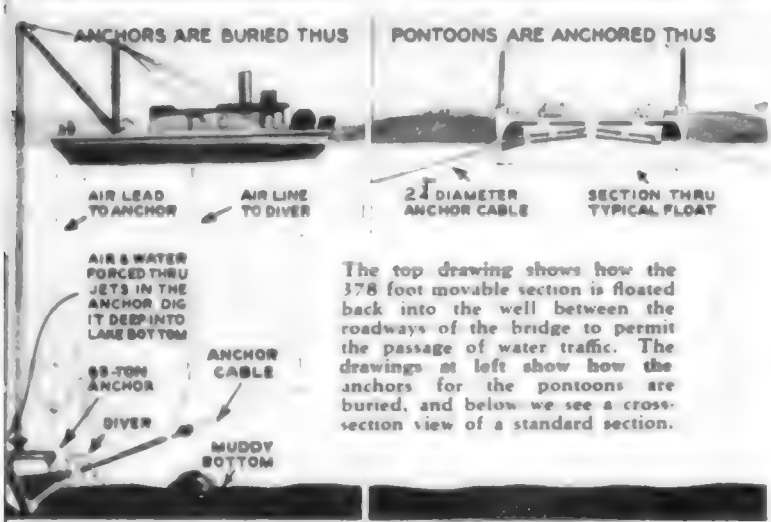
THIS machine, the affectometer, is used by American Airlines' pilots to learn how long it takes to recover after being upset mentally or emotionally. Electrodes are strapped to the palm of the hand, where they electrically record the secretions of the sweat glands, which are active during all types of emotional stimuli.

# Seattle's New Bridge -



SKETCH MAP SHOWING LOCATION OF NEW BRIDGE

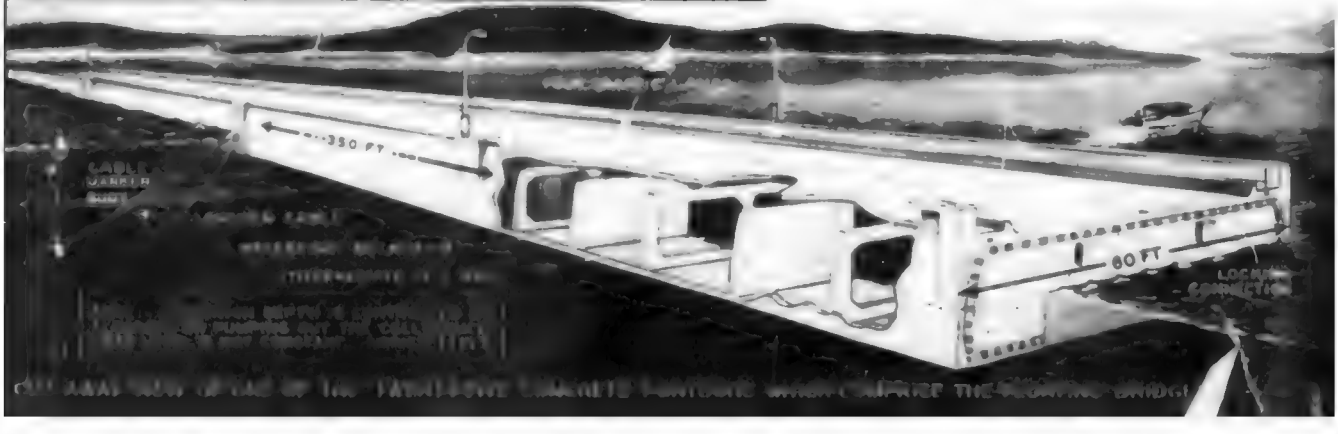


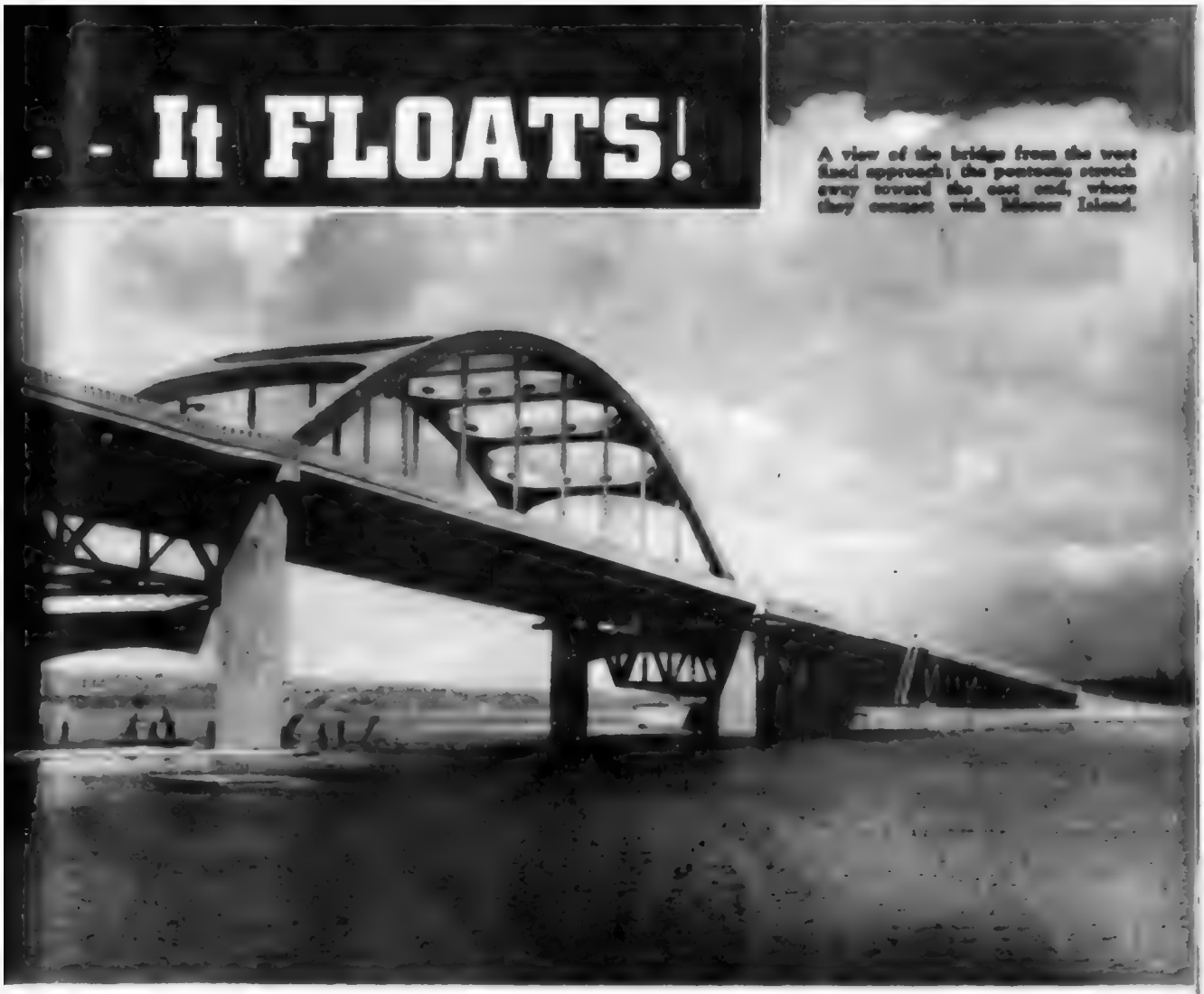

The top drawing shows how the 378 foot movable section is floated back into the well between the roadways of the bridge to permit the passage of water traffic. The drawings at left show how the anchors for the pontoons are buried, and below we see a cross-section view of a standard section.

THE concrete pontoon bridge recently completed across Seattle's Lake Washington is the longest and largest floating bridge in the world. Built of reinforced concrete, the unique bridge is 1.3 miles long (6,561 ft.) and has a roadway width of 45 feet. Its completion establishes an enduring monument to modern civil engineering.

It may be wondered why a floating type of bridge was determined upon for the crossing of Lake Washington instead of orthodox construction of the cantilever or suspension type.



# - - It FLOATS!



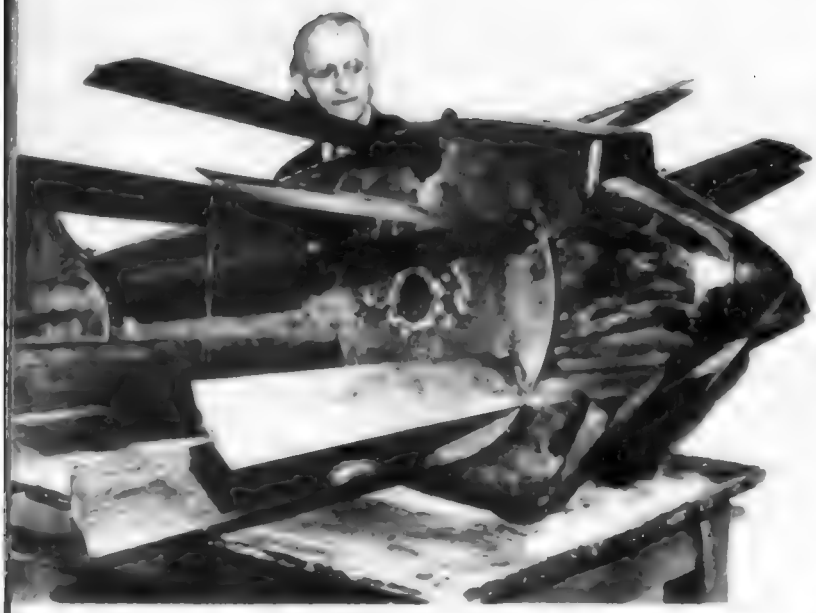
A view of the bridge from the west fixed approach; the pontoons stretch away toward the east end, where they connect with Mercer Island.

The floating type bridge was selected because it is by far the most economical to construct and the lake conditions are ideal for such a type. Lake Washington has an unstable floor and it is doubtful that any foundation for concrete piers could be found within a reasonable depth. Even though foundations could have been made, the cost for an orthodox type bridge at the point wanted would have been approximately $15,000,000 from the west shore of Seattle to Mercer Island. This is almost four times the cost of the floating bridge over the same distance and is but a little less than twice the cost of the entire Lake Washington Bridge project, which includes the building of six-and-a-half miles of new highway, involving eight different types of construction.

The floating portion of the bridge is made up of ten standard floating sections and fifteen special sections. The standard sections are 350 feet long, 60 feet wide, weigh 4,558 tons, and are honeycombed with 96 cells each. Sixty-four 65-ton anchors will hold the sections in place. The elevation of Lake Washington is subject to slight change, but is controllable by government locks; any adjustments necessary at the point of connection with the fixed approaches at either end can be made through compensating flotation units, which may be raised or lowered.

The most novel feature of the unusual structure is a draw span which may be slid into a recessed waterway, providing a navigation channel 202 feet wide for the passage of large ships. It's a pontoon-on-wheels, a $400,000 item in what engineers call the "tuning fork" design, with the moving part sliding between the prongs of the fork under the watchful eye of an operator in a control tower. This movable floating section is the largest of all the floating sections and has a length of 378 feet.

The first floating bridges in recorded history were used for military purposes about 330 B. C. by Alexander the Great. These military bridges were then, as are those of today called pontoon bridges because of the type of flotation units employed. Military bridges are necessarily of a temporary character and a different type of construction and flotation is needed for more permanent bridges.

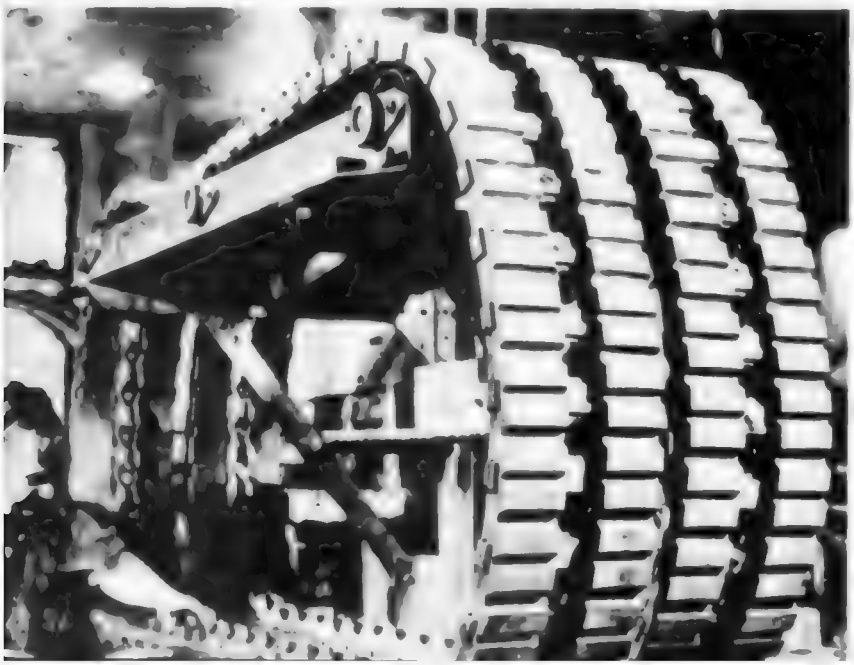


## It Looks Good—
## But Will it Fly?

PROFESSOR F. K. KIRSTEN, of the University of Washington aeronautical department, is shown with a scale model of a new type bomber in which he is trying to interest military authorities. The cycloidal propellers extending from the side of the plane in place of wings would give it a speed of 500 m.p.h., he claims. Smaller propellers of the same type would guide the plane from the rear. Kirsten is also the inventor of a marine cycloidal propeller.

## "Baby Blitzkrieger"
## Ready For Action

DESIGNED to carry four fully-equipped soldiers, this tiny army car was designed by Powell Crosley, well-known car and radio manufacturer, who is shown driving his Lilliputian creation. Already tested by Army officials, the car can carry a full load at 60 miles an hour and makes as high as 50 miles to a gallon of gas. It is powered by a two-cylinder airplane-type motor, considered especially adapted to army work because of its air-cooled feature.



## U. S. Tanks Get
## Rubber-soled Shoes

AS THE United States' great defense armament program gets under full steam, practically every industry finds itself contributing to Uncle Sam's military might. Working overtime these days are the big rubber manufacturers. Here is a workman putting the finishing touches on rubber tracks for tanks, capable of 60 mile-an-hour speeds over the roughest terrain.

## Special Aquaplane For The Big Race

THE young lady at the right is arranging the ropes on a new specially designed aquaplane. Dale Carpenter, rider, collaborated with designer R. L. Hawthorne in creating the "W and U" bottom of the aquaplane. The purpose of the special contours of the laminated underside is the elimination of the tendency to swerve. The photo below shows it in action.

## No Place For Shaky Nerves

MR. W. F. HUNTER doesn't seem particularly concerned over the possibility of a bad shot as he holds the toy balloon in his mouth. Then Ken Wilhelm draws back an arrow in the bow. The twang and pop that follow leave Mr. Hunter sucking on a broken balloon shown at left—Mr. Wilhelm's arrow having done the job. The latter is one of the finest archers in the country

The Vanguard taking off. The landing wheels and struts fold inward into recesses in wings.

Mechanics removing gun barrels for replacement, and loading ammunition.

# 10 Machine Guns In New Fighter Plane

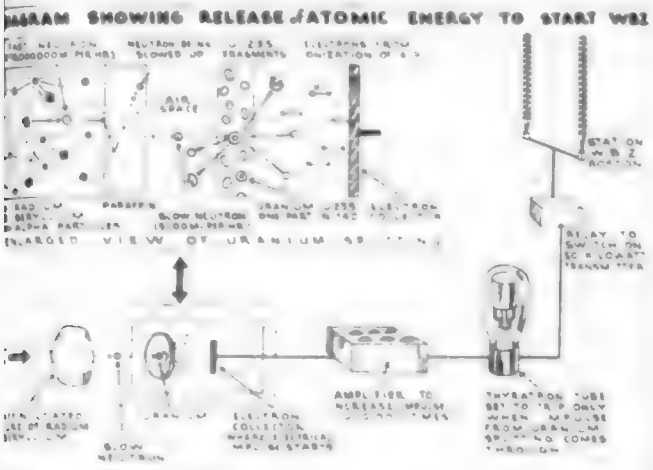
THIS new American fighting plane, the Vultee Vanguard, is believed to be the most heavily armed ship of its type ever to roll off a production line. Thousands of rounds of ammunition are carried to feed the ten machine guns that comprise its regular armament. Specially designed mechanisms on the hidden guns enable the ground crew to remove the smoking barrels a moment after the plane comes to a stop on the field. Replacement barrels can be installed in a few moments. Removable panels on the fuselage permit instant inspection of the important mechanisms of the ship, including fuel lines, structural members, and guns. This 400 m.p.h. fighter can land, reload with ammunition, repair all guns, and return to action in less time than many ships take to land

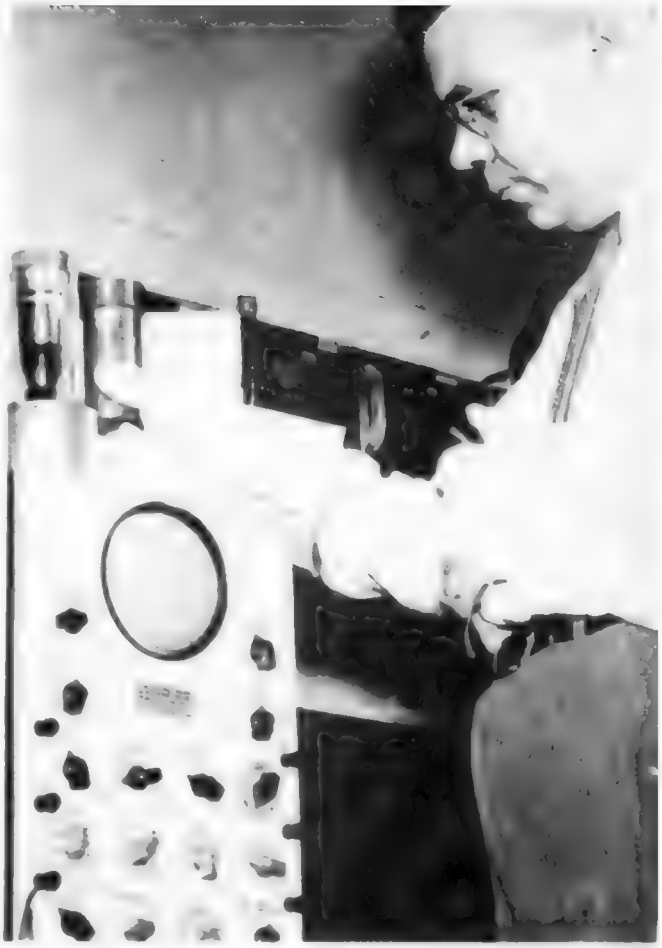
As the pilot climbs from the cockpit mechanics remove the panels and begin

*Mechanix Illustrated*

## The Atom Goes To Work

THE newly unleashed energy of the split uranium atom made its world debut recently when it turned on the new 50,000-watt, air-cooled transmitter of broadcasting station WBZ, in Boston. The explosive force of a single U-235 atom was released, in the manner shown in the diagram below, to start a chain of electrical reactions which ended in switching on the transmitter. At the right is Dr. E. U. Condon, who designed the atomic "power plant."



## Clothes Save The Man

THIS new life-saving jacket, recently submitted to the British Admiralty, has a buoyancy six times that of cork, and the flotation in one coat is sufficient to keep its wearer afloat for more than 72 hours. It is made of waterproofed gabardine and is lined with "Tropal," a secret substance from which it derives its buoyancy, no inflation being needed.

*October, 1940*

# Hollywood

This huge crane had an easy job "planting" the pine forest on the Paramount lot. Without the crane, it would have been impossible.

HOLLYWOOD folks living near the Paramount studios awoke one morning to observe the tops of pine trees protruding above the high wall that hides the doings of the studio from the general public. Each day the pine forest within the studio was growing larger. The people outside the film citadel were accustomed to seeing the tops of ocean liners and whatnot appear above the studio walls, but this was the first time a forest had sprung up inside the studio.

About the time the pine trees began to appear "planted" on top of the lofty water tower and sound stages, the secret leaked out that Cecil B. DeMille was changing the famous "New York set" into the Canadian north woods for the film "Northwest Mounted Police." The setting was the camp of Big Bear, powerful Indian warrior, whose aid was sought by the leader of the rebellious half-breeds. It is the picture's most dramatic moment.

The set occupied approximately one-fourth of the total area of Paramount's 27 acres. Measuring 650 feet by 400 feet, the set proper covered more than 6 acres. More than 300 pine trees, ranging from 30 to 100 feet in height, were trucked from the San Jacinto and San Bernardino mountains in one of the biggest trucking operations in Hollywood history. Hundreds of tons of earth were hauled in to make the uneven terrain. It took three weeks to build the set—four days to shoot the scene.

Originally it was planned to film this material on location at

Here is part of the caravan of huge pine trees being trucked from the San Bernardino mountains to the Paramount studio

# Makes A Forest Move!

Right: A pine tree is dragged out of the San Bernardino forest by a tractor. It will make up part of the studio forest

Pendleton, Oregon. However, Art Directors Hans Dreier, Roland Anderson and William Flannery proved to DeMille that the set could be built at the studio at a cost less than the expense of sending the company on location.

Trees were "planted" on top of nearby sound stages and on the towering water tank—both to disguise them and to give added distance to the scene. A hill, about 25 feet high, was made from a huge pile of dirt covering a framework of timbers. A cliff was made of artificial rocks, which were made by covering a framework of wood with wire and cement. A trail led to the top of this hill. On top of the hill were tepees and more pine trees.

Approximately 500 Indians were used in the scene, 200 of them secured around Hollywood by the Central Casting bureau, the rest from Arizona and Central California.

Five assistant directors were needed to handle the mob. A Forest Ranger was constantly on duty on the set as a precaution against fire. Every costume company in Hollywood was raided for Indian costumes, trinkets and beads. Every available rifle of 1885 vintage was pressed into service. A public address system was installed, with 16 loudspeakers scattered around the set and camouflaged inside tepees or inside hollow trees so that DeMille's orders could be carried to every part of the scene. Hollywood could have brought the mountain to Mohammed!

Above: Constructing a "mountain" of dirt and artificial rocks, which are made by covering a framework of wood with wire and cement. In the background are prop New York houses. Below: A scene from the picture.

# Five Miles Up—On The Ground!

The photograph above shows workmen hoisting the huge wing into place on a 4-engined pressurized Douglas stratoliner.

Above: Periodically photographed during flight, this vast instrument panel records artificial cabin "atmosphere" conditions. Below: A pre-flight pressure check.

HOW would you like to climb five miles, yet never leave the ground? Engineers in various airplane manufacturing plants could arrange such a trip in novel pressure chambers, arranged to give any desired "elevations." These tanks are used to determine the flying level which will give greatest comfort to passengers flying in the sub-stratosphere.

Ordinarily, pilots and passengers require oxygen to build up the depleted supply in their bodies around the three-mile level. Tests in the tanks revealed that up to about two miles, everyone breathes easily, gets

[*Continued on page* 143]

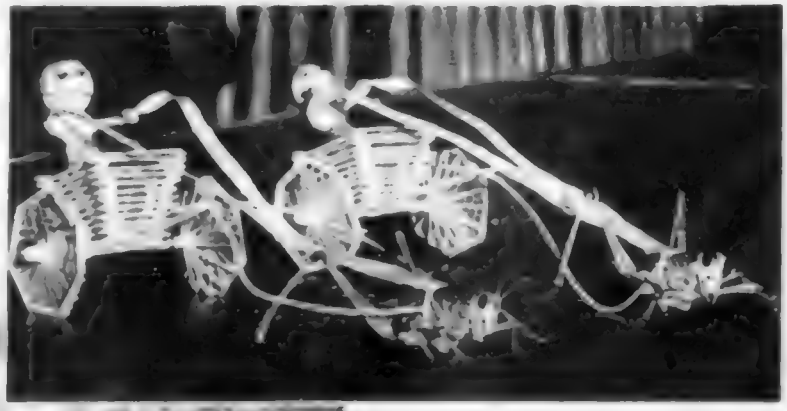
Below: In this tank artificial pressures are created in order to determine what levels afford greatest comfort.

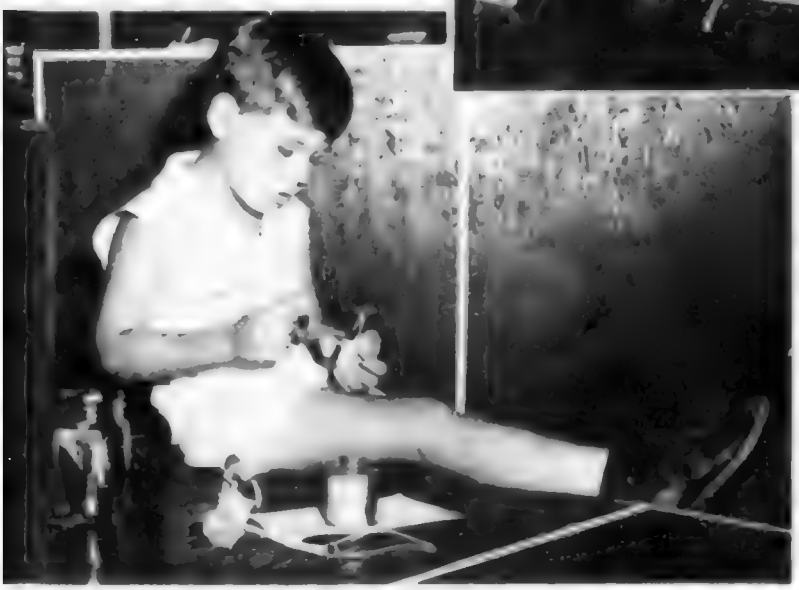
## Looks Like Monkey Business

TOTO, the gorilla, doesn't look particularly pleased with the new electric pacifier that is being demonstrated on him by his trainer. Toto is owned by a woman in Havana who had it made to quiet him. The rod, powered by batteries in the handle, gives a 5,000 volt shock, but low amperage prevents injury.

## Professor Builds A Press

DR. FRANK C. BAXTER, professor at the University of Southern California, explains the workings of a miniature press he built to Ruth La Rue, U.S.C. co-ed. Without descriptive material, and only crude drawings dating back to 1498, Dr. Baxter made this working replica of the presses used back in the days of Shakespeare. Note the plates in his right hand.





## There's A Kick In Grasshopper Racing

WITH his sulky-racing grasshoppers, six-year-old King Bishop, of Miami, Florida, is "jumps" ahead of his playmates. The vehicles are made of toothpicks glued together, and the wheels are toy paper parasols. The 'hoppers are Florida giants.

# He Propelled His Way

Harold Stoehrer, Jr. (right), and his father stand in the door of their shop and inspect a propeller which has been sent in to them for pitch correction.

WHEN Harold Stoehrer, Jr., discovered that marine experts estimated that 90 per cent of the world's marine propellers were imperfect, he knew he had found an uncrowded profession.

When he discovered a fact that nearly every seafaring man already knew, that only two or three places were available for propeller correction and repair, he knew it was time to turn what had been his most interesting hobby into a commercial business. Where it had been fun to make a propeller do its job better and to have the praise of a boat owner, he would now have both the fun, the praise and the fee for the work.

So it was that a thirst for knowledge which had led him through the files of thousands of magazines and books at public libraries, also put him and his hobby into a business, which is now bringing him both fame and fortune.

At the age of 23 he ranks third in the world's propulsion engineers and is consulted about propeller problems by the governments of the world. All because when he went to the library to read more about propellers, he made the important discovery that there was almost no available printed information regarding the science of propelling a ship through water with a screw.

He finished his high school days in the depths of the depression and it looked like he could not permit his parents to make further sacrifices to send him to college. He had been playing with boat propellers for a number of years and many a boy had brought a faulty propeller down to his backyard workshop. He said the first propeller he tried to fix had a bent blade and before he was through, he discovered there were many mysteries wrapped up in the manganese bronze of the average screw propeller.

"When I found it impossible to buy books, tools

Harold lays out what he intends to do to a propeller blade before putting it into the large press

# To Success!

by L. H. Houck

**Many people have turned their hobbies into businesses, but none more successfully than Harold Stoehrer, Jr., whose forte is propellers, plain and fancy!**

Above: Harold looks over a large propeller which came up from South America for repairs. Right: The homemade press for large propellers. Using jacks and levers, it presses the blades into new positions.

or gauges for propellers," Harold Stoehrer says, "I became more interested and started to make my own implements and recorded my own data.

"Every time I could find an old propeller which had been thrown away," he continues, 'I'd experiment on it. The results of these experiments started me on building a complete set of gauges and put me to studying pitch and its relation to boat bottoms. People began to bring me their propellers and their troubles, and the wheels and troubles got bigger and bigger, and so we had to have bigger tackle and bigger blocks to handle them.

"Finally my dad decided to give our propellers a name and he called our workshop the Southern Propeller Company, and we now have the largest collection of propellers in the South. We have been told there are

Incoming propellers are "spiked" on these wooden pedestals to await their turn in the shop.

In an old gap-bed lathe propellers are set up on a mandrell. A special chuck was made to use instead of a dog for turning the propeller. The lathe is used for turning off the ends and also for checking pitch and balance.

only two stocks of propellers in the United States larger."

In the past six years he has discovered 12,000 different combinations of propeller trouble and has made a file of this information, together with tested corrective remedies and results of thousands of independent experiments. He has inspected and corrected propellers from England and many of her colonies. The South American countries of Spanish Honduras, British Honduras and Colombia have sent propellers to this little shop on the banks of the Manatee River at Manatee, Florida.

His most recent victory was a yearly contract from the United States War Department, for propeller repairs to its boats in U. S. Geodetic Surveys and in harbor and channel work, a contract that is sending in several hundred propellers every year.

Harold Stoehrer smiles at memories of his search for printed information. He searched several libraries without success. He found that Archimedes, most celebrated of Greek mathematicians, invented the revolving screw for raising water in 287 B. C., but found no record the Greeks had a word for a damaged propeller screw that pounded out the insides of a five thousand dollar Diesel.

He looked up the history of steamboats and found that a screw propeller was a device for the propulsion of vessels which worked on the same principle as a bolt in a nut, the propeller corresponding to the bolt and the water to the nut. He found the propeller was described as a form of cylinder to which are attached continuous spiral blades arranged as threads on a screw. In another book was the statement that the screw's revolution in water under the impulse of the engines caused a steady displacement of the water and the subsequent forward motion of the ship.

Further research added to his meager store of facts the facts that several American inventors experimented with the idea of the screw propeller and that John Stevens built a screw propelled steamboat in 1802. The principle was perfected by Ericsson, who brought it to the United States in 1839 and sold his invention to the United States Navy.

As young Stoehrer searched, studied and experimented, he discovered several of the most important phases of screw propellers seemed to be carefully guarded secrets known only to a few people. There was no technical information or charts, for instance, showing any research work regarding size and pitch of propellers in relation to such variable factors as boat bottoms and engines.

He admits today this lack of information intrigued and inspired him to see what lay ahead. He now owns several thousand special gauges which he has made himself, that he uses in repairing and restoring damaged or inefficient propellers. Since these gauges are unpatented, he is required to keep their details secret from the general public

One of his earliest hard knots to crack was when he asked a large ferry boat company for their propeller work. To put it mildly, he was laughed at, although they admitted having some trouble keeping their boats on schedule. They admitted they didn't know whether they needed more power, more revolutions of the propeller or propellers with more pitch. Naturally they had various ideas but they were sure they were not getting enough miles per dollar.

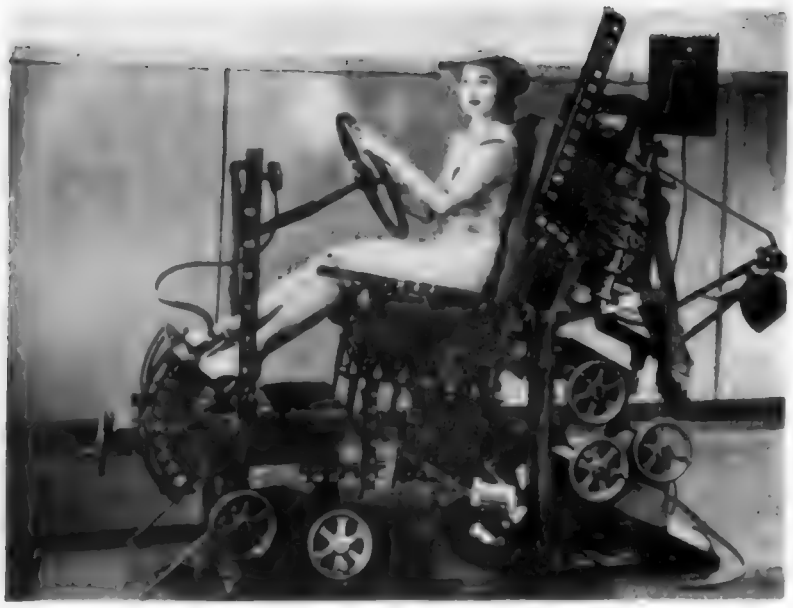
Young Stoehrer made them a proposition. He asked they have their engineers work out the number of revolutions at which their Diesels operated most efficiently, taking into consideration obtaining the most efficient operating temperature. This would be the spot at which these slow moving engines would run most efficiently both as to power and fuel economy. He then proposed that at his own expense, he work out and install the proper propeller as to size and pitch to fit the bottom of the boat and have right relation to the engine revolutions. He told them if he didn't reduce operating expense and put the boats to dock on time, it would cost them nothing.

Almost reluctantly company officials agreed to the proposition. When young Harold went

[*Continued on page* 142]

**Above: Part of the rack of propellers on the wall. The one Harold is holding is an example of what a good propeller does *not* look like! Below: Working on a propeller at the welding bench of the shop.**

**Below: The final operation is buffing and polishing. Repaired propellers can hardly be told from new ones.**



## Sit Down And Make Yourself Comfortable

OF ALL the many figures on this complicated machine, that of the young lady is perhaps the most important. As she sits at the wheel the apparatus is repeatedly readjusted to enhance her comfort. When she is fully at ease the final reading of the adjustments is taken. Many people have been tested in this machine at the University of Michigan for the purpose of finding the average sitting posture—an aid in designing auto cushions.

## Enough To Make Danes Melancholy

OWING to the motor fuel shortage, Copenhagen taxicabs are now indirectly powered by Danish pastry. Of unusually light construction, the cabs accommodate two passengers in addition to the driver. Aside from his duties as chauffeur the husky cabby must also serve as engine and provide the motive power for the machine through a pedal and sprocket system similar to that of a bicycle. A roll-back top protects him if it rains.

## Kilocycles Meet Bicycles With Radio

THIS young man is enjoying his youth the modern way. His bike is equipped with a newly developed handlebar radio on a shock absorbing mounting that protects it from road bumps. He need never fall behind in his current events class. On the way to school he can hear the latest music and the latest news—and if he hears an unfavorable weather report, he can turn back home—the modern way, like the airlines do. The aerial is on the fender.

# He Leads A High Life!

Electrician Kiernan takes a few moments off to relax.

FEW motorists have ever given much thought to the problem of replacing the lights that beautify the George Washington Bridge for the night drivers—and the night flyers as well. Electrician Kiernan has the job of keeping those lights in commission. It is his job to climb to the highest points of the towering structure when a light is out, and to make that light burn again. The red lights that stand out on the uppermost tips of the giant cable towers serve the purpose of warning away low flying aircraft, and also of providing landmarks for the unscheduled night flyers.

Mr. Kiernan uses various kinds of tackle to reach the different points on the bridge. Much of the wiring is available by walking up the suspension cables. Other sections must be reached through the use of the familiar bosun's chair and a special cable. The guide cables that assist the workmen who must go up the main suspension line are held in position by vertical struts, practically all of which support a light. These, however, are comparatively simple to repair. Strangely, it is the navigation lights on the piers, only 40 feet above the water, that require special cables.

Climbing the main cable. Note light and safety strap.

A "trolley ride" to the pier in a bosun's chair.

# Giant Camera Speeds

The mixed floor or "loft" where giant planes are born.

by James Nevin Miller

IMAGINE a camera half as large as a house, which uses plates 10 by 5 feet in size, whose lens alone occupies one enormous room, and its plate-holder another! Sounds suspiciously like the overworked imagination of a photo fiend, doesn't it? Actually this super-giant is the latest brainchild of the Glenn L. Martin Aviation Company of Baltimore. The purpose of the camera is to speed up airplane production by the entire industry to a degree never before realized. Full scale pictures can now be made directly on cloth, wood, paper or metal.

As is well known, the Martin Company specializes in the making of bombing planes for the U. S. Army and patrol aircraft for the Navy. The new method makes it possible to produce these sky ships on a mass production basis with a minimum of time, trouble and expense. Indeed, as a result of tests already completed, company officials expect the camera to save between $80,000 and $200,000 a year in drafting costs alone.

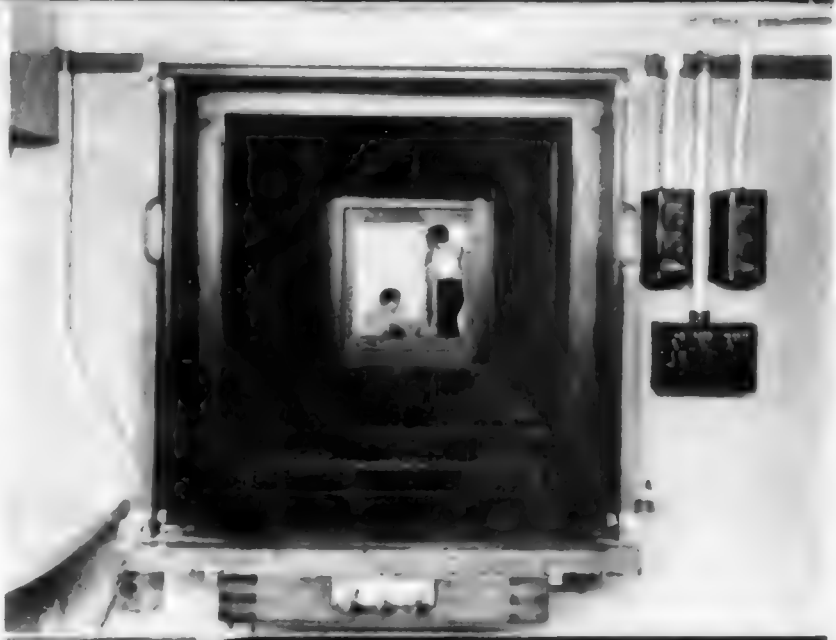
For years the Martin technicians have been building their planes mainly by hand methods, while searching for some way to get rid of small production limitations. A striking example is this situation: a certain popular automobile requires 218 man power hours of labor per car to make, whereas most small planes require 350 to 400 man hours. As for the larger bombing planes, one of the major standard types requires 14,000 man hours to make.

Thanks to the giant camera, efficiency standards which have long been in operation in the automobile industry may now be used for the first time to speed up airplane production.

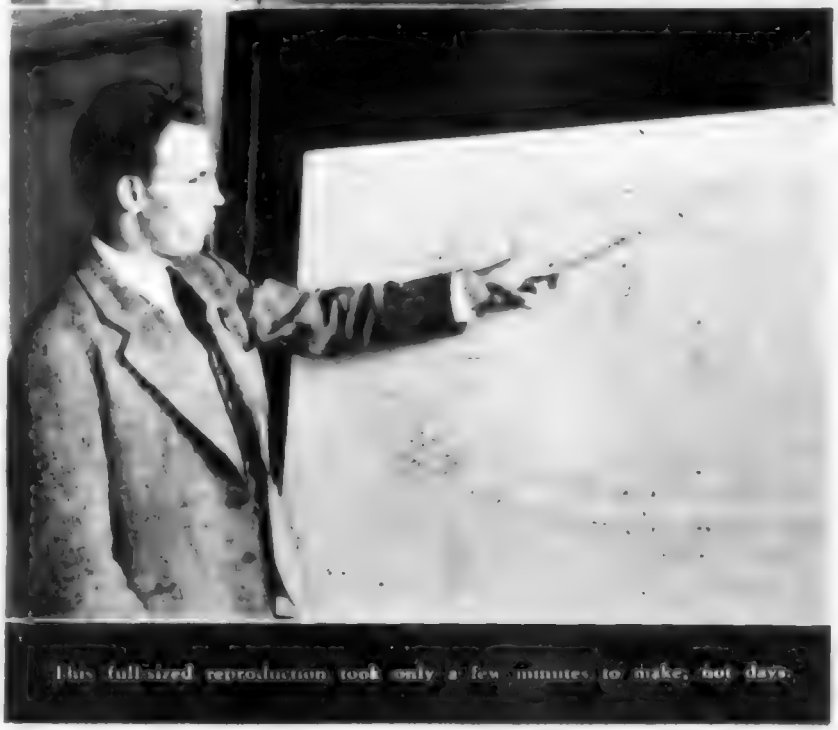
Ordinarily the 10 by 5 foot prints are made on thin sheets of aluminum alloy coated with a highly sensitized surface. Enormous tanks must be used for developing these sheets and the original full scale drawings appear in exact size on their surfaces. Under certain emergency conditions the drawings can also be reproduced in fractional or multiple scales, on cloth, wood, paper, or indeed, almost any printable substance. If such drawings were

# Plane Production

**Mass production of war planes has introduced a new technique to the engineering departments of aircraft manufacturers. Original drawings can now be "blown up" to full size, and airplanes built directly on them, accurately and quickly.**



One end of the giant camera



This full-sized reproduction took only a few minutes to make, not days.

made under ordinary conditions, they would require days or even weeks of redrafting, whereas today they can be completed in an hour or two. In some instances drawings can be laid out directly on metal in a matter of minutes, a sharp contrast to the standard procedure which requires days to make layouts on metal from blueprints.

Engineering work and tool designing and making can be speeded up tremendously and made far more accurate. Since it is now easy to make any number of exact-scale drawings, much better teamwork can be achieved between the various vital departments of the factory.

The new method lends itself nicely to the making of test planes of all kinds. Instead of having to consult small blueprints from time to time, the aeronautical engineer simply studies his full scale drawings, which, in most instances, can be made directly from photographs. As a matter of fact, the master drawings, precisely accurate in the smallest detail, can be photographed directly onto the metal of which the airplane is to be built and the parts cut directly from the material. Assuming that a wind-tunnel or water basin model of a proposed skyship is desired, the procedure is very simple. The camera is used to scale down the lines from the full-size drawing to a fifth, a sixth, or any other fraction of the original size. Probably weeks of redrawing to scale may be saved.

There are many other important jobs for

the heroic camera. Drawings can easily be projected onto tracing paper, vellum, or wood for various purposes. Ordinary photographs can be "blown up" on paper, canvas or wood paneling to sizes as large as 10 by 5 feet for photo-murals.

There are definite indications that the camera will revolutionize and simplify many phases of aeronautical engineering. Today, of its 12,000 employes, the Martin Company has 900 engineers on its pay roll. Without the camera, this force would have to be several times larger.

Naturally the company requires plenty of space in order to make its original drawings in full size. The basement of the Baltimore factory serves the purpose very well. Here a huge chalk-white floor has been made, raised above the level of the building floor, on which airplanes and airplane sections are drawn out in full size by engineers who walk and crawl over the floor, wearing flannel window dresser's slippers over their shoes. In a sense this is a giant "playroom" for adults, for here the draftsmen and designers plot out every detail of the new airplanes. Not only can they work on outlines for all present-size planes, but the floor is large enough to accommodate the contours of airplanes larger than any yet built.

After all parts of the structure have been laid out in outline, all kinds of engineers visit the floor to study the new design. Stress analysts examine each part of the assembly to determine what trusses, stringers and braces will be needed to carry the loads imposed. Tool designers lay out tools and dies for each part, large or small. Production planners examine the layout to plan the shop and assembly line operation and to arrange for uninterrupted flow of parts from machines to minor assembly departments and into the assembly line. Next details are sketched into the full-scale drawings on the floor in conformity with the findings of all the engineers concerned with various design and production phases.

Here's where the giant camera enters the picture. Wing ribs, spars, fuselage bulkheads, all of the hundreds upon hundreds of parts which go into the com-

[*Continued on page* 145]

# You're RIGHT—That's WRONG!

Here are 25 statements, some of them true, the others false. The trick is to separate the *true* statements from the *false* ones—and it isn't as easy as it looks! Use a pen or pencil and check the correct box under each statement and see how you make out! After you've given yourself the test, try it out on friends and other members of the family and compare scores. They'll enjoy it and so will you.

Are you ready? Let's go!

1. A booby hatch is a part of a boat, such as a sliding hatch leading to a cabin.
   True ☒ False ☐
2. The pitch of an airplane propeller is the tar used to hold the layers of wood together.
   True ☐ False ☒
3. The distress signal, SOS, is not officially the abbreviation of any sentence or group of words.
   True ☐ False ☐
4. Neon, the gas used in advertising signs and various scientific instruments, is named after its discoverer.
   True ☒ False ☐
5. German silver, widely used in radio construction and electrical work, contains no silver.
   True ☒ False ☐
6. The tent fly is one of the deadliest disease-spreading insects, sometimes destroying entire regiments in war time.
   True ☐ False ☒
7. Rotary clubs are engine-driven battle axes, the latest addition to the long list of weapons designed for modern mechanized warfare.
   True ☐ False ☐
8. Hygieia was a mythological goddess of health, worshipped in ancient Greece.
   True ☐ False ☐
9. There were no horses in North America before the white man arrived, the Indians having to content themselves with traveling on foot when on land.
   True ☐ False ☒
10. Like croquet, polo is played with a wooden ball.
    True ☐ False ☐
11. Although the islands of Langerhans have been known since the nineteenth century, they have never been visited by a boat.
    True ☐ False ☐
12. A nightshade is a special filter used on cameras after dark to improve the quality of the negatives.
    True ☐ False ☒
13. Oryx is the name by which a large African antelope is commonly known.
    True ☒ False ☐
14. A bathometer is a delicate thermometer used by nurses to assure the proper water temperature when bathing hospital patients.
    True ☐ False ☐
15. The terms "male" and "female" are used to denote certain differences in threaded pipe and machine fittings.
    True ☐ False ☒
16. A heliotrope is a military device that utilizes the rays of the sun for signalling from distant observation posts.
    True ☒ False ☐
17. The gaff of a sailboat is the depth to which the hull settles into the water when floating normally.
    True ☐ False ☐
18. In 1896 a steam driven model airplane flew 4,200 feet at a speed of 30 miles per hour.
    True ☐ False ☒
19. Double valve springs have sometimes been used on high speed engines because the time taken by a single expanding spring was too great.
    True ☒ False ☐
20. In order to save weight, most outboard boat motors are entirely air cooled.
    True ☐ False ☐
21. Although it resembles a rifle in general appearance, a shotgun is not a rifle.
    True ☐ False ☒
22. Hypoid is a strong resin, resembling celluloid in appearance, and widely used in gear manufacture.
    True ☐ False ☒
23. In order to bomb any objective, a military airplane must release its explosives before it reaches the point to be hit.
    True ☒ False ☒
24. Blueprints are made by tracing the original sketches on blue paper with white ink.
    True ☒ False ☐
25. A rhinoceros is sometimes referred to as a pachyderm.
    True ☐ False ☒

### WHAT'S YOUR SCORE?

To get your score, simply give yourself 4 points for every question you answer correctly and total the result. If your mark is above 90, you are exceptional; if it is between 80 and 90, you deserve high praise; if it's between 70 and 80, you're good; between 60 and 70, fair; and below 60—well, try again next month!

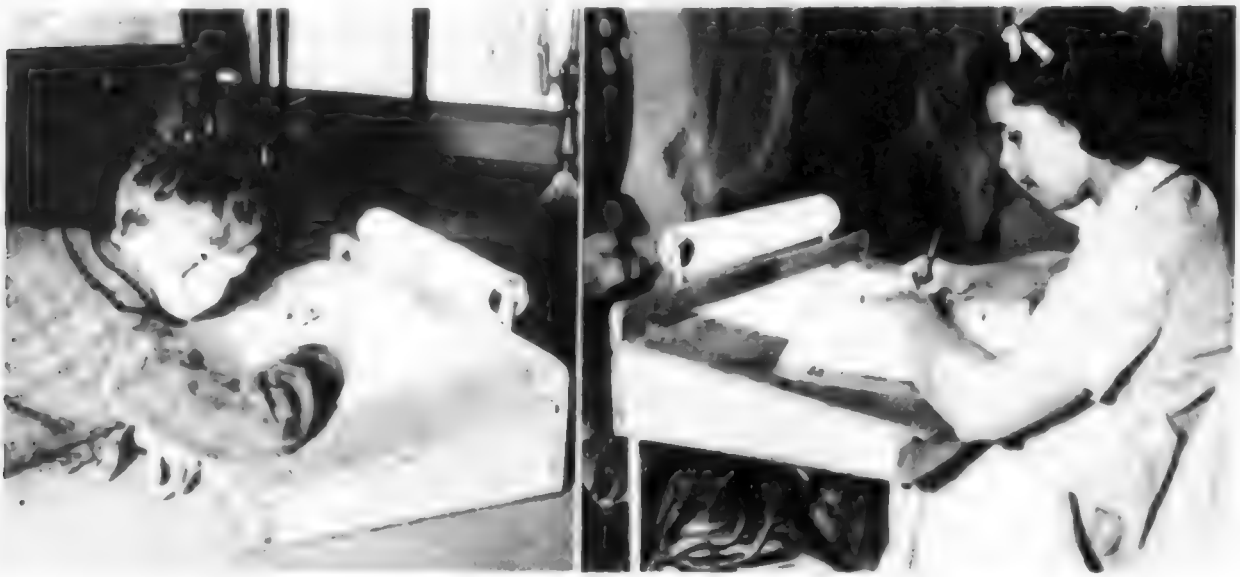
*Answers will be found on page 144*

## Corking Fine Arts —Corks For Parts

MR. LUDWIG WRONKOW inventor of the new type of cork-sculpture, is shown below, instructing a young artist in the technique. Known as "Cork Craft," this new diversion employs toothpicks and corks as media for three dimensional caricatures with pencil sketch heads. At the left are some corky dogs examining a corky palm in search of treed corky cats.

## Lie Down On Jobs With A Tummy Desk

TO TRIM down the gap between working and loafing, this new desk has been designed to permit students to pursue their courses while lying on the floor. Short, removable legs permit the desk to be used in bed so that the diligent student need not get up and lie on the floor unless he is ambitious. Roll paper at top eliminates paper changes.

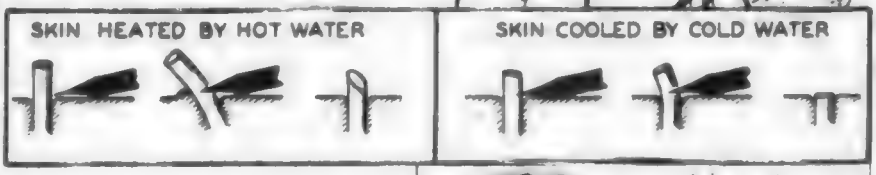


# A Clean Face is a Shaving Grace!

OF THE 40,000,000 Americans who wield safety razors, the vast majority are rank amateurs. Take a few tips from this page, suggested by Razor Research, Inc., and learn how to shave right!

No chain is stronger than its weakest link. Uninformed and improper use will quickly destroy the efficiency of any article, however perfectly made at the factory. Shaving accessories are no exception. When things go wrong: when razor pulls, scrapes, cuts, and finally is stalled on some chin—it is always the blade, the razor and the shaving soap (in the order named) that get the blame: *never* the users' own technique, even though, all too often, it is the latter that is glaringly at fault. If you ask most men what kind of water they use for shaving, the answer will be either *hot* or *cold*—neither is satisfactory when used *alone*. Correct shaving technique calls for the use of both—and there is not one man in ten who knows this simple fact!

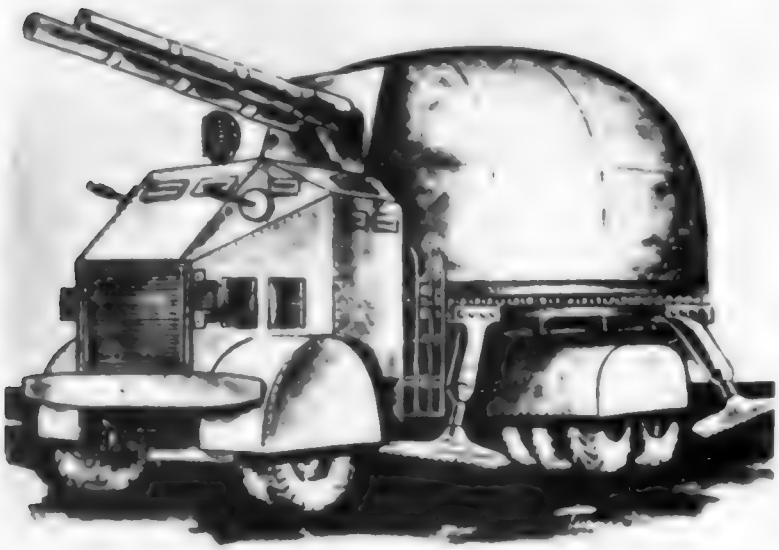
When heated by hot water, skin becomes flabby and soft, relaxes its grip on the hair. When cooled by cold water, skin becomes taut and unyielding. Hair is cut before it has a chance to bend, and there are no "skin mounds" to buck the blade.




In the strip at the left we have the correct technique for shaving. 1. Wash your face with *warm* water and ordinary soap—then rinse it clean. 2. Soap your face again—the *second* time—with your favorite shaving soap, either lather or brushless. Use *cold* water, and take your time. 3. *Scald* the razor head under the hot water faucet to keep it *hot*—but not too hot—throughout the shave. 4. *Stretch* the skin, either with your fingers or by making faces at yourself in the mirror. 5. Shave in short, rapid strokes—to bring heat to the hair without heating the skin. Lots of soap. Plenty of time. Cold water on the face. Hot water on the razor. That's all there is to comfortable shaving!

## Hostesses Trained In DC-4 "Mock-Up"

THIS wooden "mock-up" of the cabin of a Douglas DC-4 includes every detail of the huge ship's interior. Costing $10,000, it was originally used by the company's engineers for experiments with cabin appointments. Now that the preparation of the ship is completed, the model cabin is used to train air hostesses for future duty in real planes.



## Mile-A-Minute Fort Has Fourteen Wheels

THE new U. S. war truck that recently escaped destruction in a mysterious fire, is shown in the drawing at the left. Twelve rear wheels support the tremendous weight of the turret with its two 6-in. anti-tank guns. The arms resembling safety razors extend down to the ground to take the recoil of the guns. Machine guns in the driver's cab ward off attacks from in front. A marine diesel engine drives the truck.

# The CCC Goes Down To Sea!

Right: The square-rigged sailing vessel *Joseph Conrad*, now a CCC training ship.

IT'S a long way from fighting brush fires and digging irrigation ditches to climbing up the rigging and holystoning the deck, but the CCC boys made it!

This nautical transformation of Uncle Sam's Civilian Conservation Corps' laddies is taking place at the Maritime Training station, St. Petersburg, Florida. There, under the command of Lieut. Commander W. W. Kenner of the U. S. Coast Guard, boys drawn from the ranks of the CCC are learning to be sailors on two romantic school ships, the square-riggers *Joseph Conrad* and *Tusitala*.

Though it is not yet known whether the graduates will be able or ordinary seamen, and acceptable as such to the maritime unions, one thing is certain—that they will be excellent merchant marine material at the end of the course, as well as likely prospects for the U. S. Navy.

Right: Apprentices unloading an old boiler. Below: Learning one of the fundamentals of seamanship—tying knots!

# Auxins Make The

Auxin, the potent and mysterious growth hormones manufactured by plants, can be extracted from plant tissue by dissolving it out with highly purified ether. Above, a laboratory attendant is inserting tomato leaves at the start of the extraction process. Below: In the California Institute of Technology plant physiology laboratory auxin produced in young tomato leaves is intercepted in the stem and collected on block of 1½% agar and water.

by

Andrew R. Boone

ALL you need today, it seems, to make your garden grow is an auxin or two. With auxins, you can grow seedless watermelons, coax seeds to germinate faster, vastly increase your crops, produce hundreds of roots on otherwise rootless cuttings, and help, by speeding plant growth, to control erosion. Furthermore—and this should be sweet music to citizens with false teeth—auxins also will enable you to turn out seedless tomatoes, cucumbers and squash.

What are auxins? Well, Webster's New International Unabridged Dictionary, which has more words than a debating society, hasn't got a one for auxins. You have to visit the California Institute of Technology to learn what there is to learn about them, for it was at Caltech that Dr. F. W. Went and his colleagues learned how to use these magic agents of horticulture, discovered earlier at Utrecht, Holland.

Lest your suspense become overpowering, it can be said here and now that Dr. Went defines auxins as "growth hormones, chemicals manufactured by plants, that in extremely small amounts control the growth." Their presence, the doctor says, can be detected only by scientific tests, and they are reputed to be even more powerful than Vitamin B-1. If you have any interest whatsoever in shaping the careers of your crops, you can't ignore auxins.

It was after 10 years of research, starting at the University of Utrecht, in Holland, that Dr. Went and his men discovered that extractions from leaves would stimulate growth in other plants. The

# Plant Grow Faster

Right: Here we see auxin being applied in lanolin paste to a cucumber seedling for a growth test. Auxin treated plants show a phenomenal growth when compared with plants which have not had the treatment.

doctor had had a properly professional suspicion—while experimenting with tropical plants in Java—that leaves were working under cover and supplying some element which caused the bodies supporting them to wax and grow stronger. With justifiable righteousness, Dr. Went felt that the leaves should be a bit more upright about all this and let the world in on what was going on.

At any rate, Caltech scientists experimented unceasingly and finally decided that it was auxin that made this leaf-supplied element work. While treating Acalypha plants in Java with extracts of many of their tropical neighbors, Dr. Went discovered that these extracts accelerated the rooting of the Acalypha cuttings. Although he didn't know it at the time, here was auxin, working away and hiding its light under a bushel.

Several years ago, he discovered he could obtain auxin by severing a plant stem and placing against the lower end a block of "solid water," a set-up which is 98½ parts water and 1½ parts agar. In one hour of such goings-on, enough auxin collects on a block to be demonstrated in an ingenious test, also devised by Dr. Went.

This is known as the Avena test, Avena being the Latin name for oat. First you plant some germinating oats in small glass holders. For two days you allow these young plants to grow happily under a dim orange light in an air-conditioned basement dark room, orange being used because white light tends to make the tender

Below: Twelve hours after the application of auxin, cucumber seedlings have bent away from the auxin, caused by the rapid growth of tissues on the side where the hormone was applied. Note the straight, untreated plant in the foreground.

shoots curve toward it, causing the plants to assume a crooked form.

Then comes the surgery.

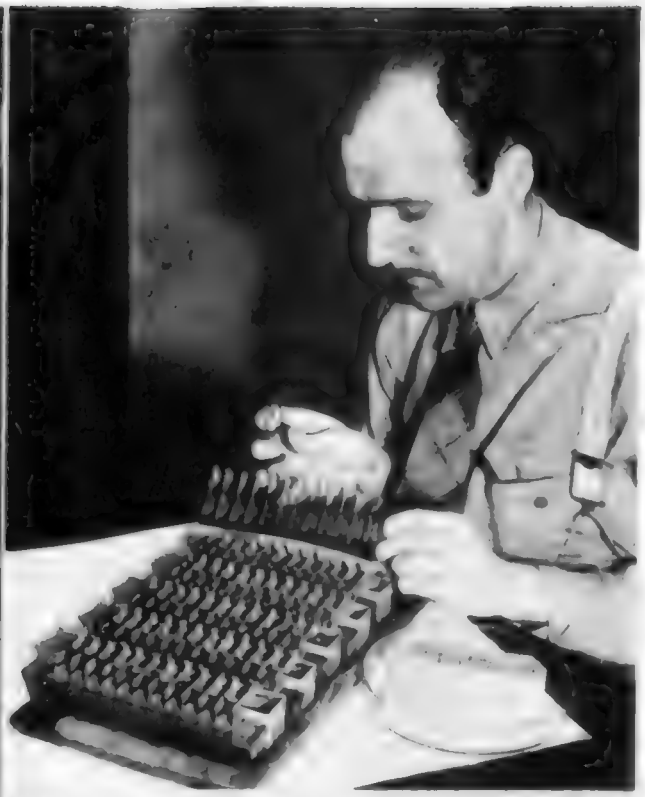
Carefully, skilled laboratory workers decapitate scores of the shoots, and three hours later, they cut a small length from the tip of each shoot. The primary leaf then is delicately pulled loose and a small agar block, bearing the fabulous auxin, is attached to one side of the leaf. Exactly 90 minutes later, the plants are removed to another room and shadow photographs are made, permanent records which are a complete giveaway on the activities of the auxin.

Auxins move only from the leaves down the stem toward the lower end. In the Caltech laboratories, the writer saw gardenia cuttings 90 days after planting. Those which did not enjoy the blessings of auxin were virtually rootless, while those which had been treated with the leaf solution before planting bore large root systems! Furthermore, roses and camellias, which are difficult to root, carried heavy roots on their cuttings following several treatments with these magic hormone agents, and lemons and chrysanthemums sported large numbers of roots within 10 days after planting.

It is possible to demonstrate the wonders of auxins right in

Above: This simple test may be undertaken at home. Place gardenia or other cutting in a jelly glass with a small specified amount of auxin solution for ten to twenty hours. As the next step, shown below, place the cutting in the soil, or in a propagating frame. You will find that your untreated cuttings will have no trace of roots, while the treated ones will have scores of long, powerful roots.

Above: This picture shows treated (right) and untreated (left) gardenia cuttings three months after planting. Note prolific growth of roots on the treated cutting.



**Left: This large model of an oat seedling shows how the tiny seedlings behave in the test by which auxin is analyzed. The flag at the top represents the agar block containing auxin, which diffuses into the side on which the block stands and increases growth, resulting in a marked curvature. Above: A laboratory technician is planting germinating oats in tiny holders. Two days later, the seedlings will be used for the Avena test, developed by Dr. F. W. Went, to detect and analyze the auxin.**

your own backyard. Place your cuttings of, say gardenias or camellias, in a glass containing only a small amount of solution (made by dissolving enough auxin crystals, which now are commercially available, in water to make a 1-to-5,000 or 1-to-10,000 ratio). Next morning, return the plants to the soil or a propagating frame. Now, just for the fun of it, plant with them a few untreated cuttings, being certain that both groups have leaves. You will find that the auxin-treated plantings will outstrip their rivals four ways from McGinty.

Dr. J. Van Overbeek, one of Dr. Went's colleagues, sees other important developments to come. Not long ago, German scientists reported that, by soaking sugar beet, alfalfa and other field-crop seeds in an auxin solution for several hours, yields were upped by 50 per cent. "One method which may prove useful in soil conservation and quick reforestation," he said, "is to plant auxin-treated cuttings of the natural vegetation. In moist soil, these will begin immediately to take root, and shortly will reach down into the deeper layers where they will find water. Science seriously proposes this type of reforestation as worthy of trial."

Spectacular as are auxins, they have their limitations. They *do* cause roots to start, but only in combination with Vitamin B-1 can they cause the roots to continue growing vigorously. Auxin kicks the roots out from the tissue, and B-1, one part to 100,000,000 parts of water, poured around the base of the young plant, develops them into strong individuals.

Dr. Went's discoveries recently turned into new, palate-tickling paths. At the University of Michigan, Dr. F. G. Gustafson has developed seedless fruits, including tomatoes, squash, cucumbers and bell-peppers. At nearby Michigan State College, a Chinese researcher, Chiong-Yin-Wong, produced the seedless watermelons.

How was it done? With auxins, of course. These scientists applied auxins to flowers before pollination took place. They didn't create any new seedless varieties, and only the flowers treated yielded seedless fruits.

# The Shape of Planes to Come

Above: A tractor-pusher type. Machines of unusual design, such as this one, could only be pioneered practically in the model field. The mounting of the wing motor is made removable for single operation. Below: This flying boat model shows the wide variety of designs made possible by the small gasoline engine. These cabin ships are good flyers.

THE full sized transport ships that will race along the skyways of tomorrow are largely in the hands of the model builders of today. Youngsters who learn the rudiments of aircraft design early through their interest in miniature aircraft are assured of success as they advance. Technical education will furnish them with the knowledge necessary to put their originality into the wonders of the stratosphere that may someday span oceans in a matter of minutes. The little machines shown indicate refinements of design and adherence to approved practice well worthy of future engineers. The perfection of the model gas engine has opened new realms of experiment to the model builder.

Above: Launching the flying boat for a test glide. Power-off tests of this type are necessary to prevent crackups. Many hours of work go into a large model. Note the two lateral steps in the hydroplane type hull. The wings are detachable for convenience in transporting.

Above: A single nose wheel for landing and a pylon mounted motor and wing are novel features of this model airplane. Named the "Flying Whale," it was designed and built by modeler Leo Brady.

Left: Even gliding can gain efficiency from the model. This miniature tailless glider carries a temporary tail aloft for the launching, to aid stability. The extra tail is dropped for flight.

# Her Inventions Are Cleaning Up!

At the left is one of Miss Byington's Scrubbies clutching a glass in one hand, and the special sponge to clean it in the other. Note blinkers

Below, Miss Byington and Scrubby demonstrate the onion blinkers in operation. The goggles are also made with tinted glass for swimmers.

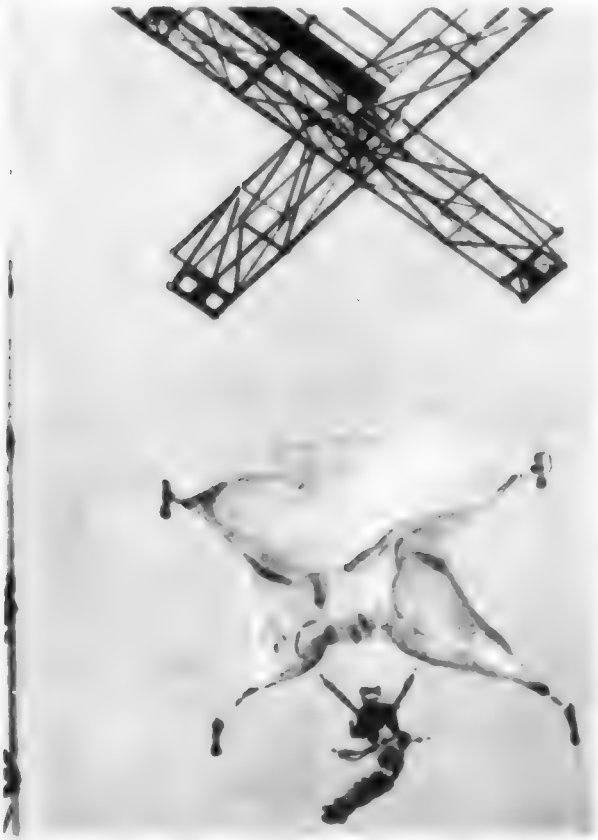
HERE'S how an amusing hobby turned into a going business. When Spring Byington, noted for her portrayal of Mother Jones in the 20th Century Fox Jones family series, began making some household gadgets to save her daughters from some of the annoying chores of housework it was merely a hobby with which she amused herself between pictures. Her daughters found these gadgets useful, and feeling pretty proud of Mother, showed them to their friends. Soon Miss Byington was getting letters from her daughters urging her to put her inventions on the market. Friends, and friends of friends, wanted to buy them. Before she realized it Miss Byington was in business and heading the Sav-A-Bak Products. The other day she was beaming with pride as she examined a sheaf of orders that had come in, some of them

[*Continued on page* 144]

The inventor shows her brainchild the spot to clean.

## American Parachute Troops

A STUDENT parachutist begins his first training descent. Cables guide the special square chutes in their fall to prevent novices from being dragged on landing. Heightstown, N. J., has been chosen as the site for the training of the first contingent of United States parachute troops. Men from Fort Benning will make up the personnel.



## Bombsight For Pilot Training

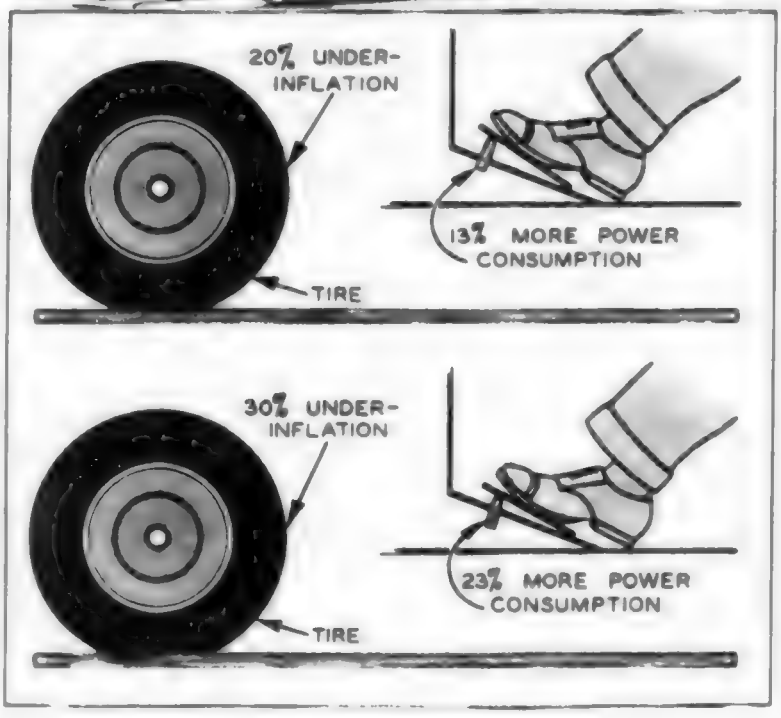
LIEUT. WILLIAM J. BOHNAKER mans the secret U. S. bombsight while Lieut Jack F. Todd handles the controls of the training platform. Note that the mechanism of the bombsight is concealed by a cloth cover to hide it from the camera. This method of training eliminates the possibility of loss of the device through a military plane crash Miniature targets are used.

## The Nails Can't Sink This Tube

JOY BARLOWE, an Earl Carrol beauty, demonstrates with a buoyant smile, the leakproof characteristics of a new type tire tube. The tube has been punctured by 19 nails without noticeable deflation. The nails are visible protruding from the section of the tube in the foreground. The holes are automatically sealed by a layer of jelly-like rubber.

# Use Air To Save Gas

Above: Engineer Anibal points to under-inflated tire. Right: Diagram showing the relative power consumption at low pressures.




KEEP your tires at proper pressure and save money when you travel this summer, advises B. H. Anibal, chief engineer of the Pontiac Motor Division of General Motors.

Under-inflation of tires not only makes driving more difficult and increases tire wear, but also has an effect on power consumption, according to Anibal.

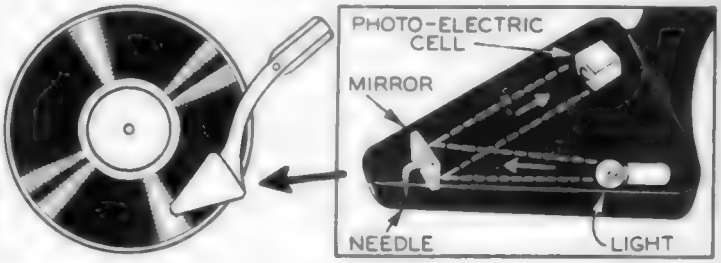
"A certain amount of the car's power must, necessarily, be expended in driving the tires themselves," Mr. Anibal points out. "The power consumption of tires at proper pressure varies according to speed—the faster the car is being driven the more power is necessary to drive the tires. As tire pressure is lowered below that recommended this power consumption is increased sharply.

"At 20 per cent under-inflation, which is quite common the increase in power consumption of the tires amounts to 13 per cent. At 30 per cent under-inflation (about 10 pounds in modern cars) the increase in power consumption by the tires is well over 23 per cent."

## Photo-Cell Phonograph For Philharmonics

THIS photo-electric phonograph uses entirely new principles in the reproduction of music and speech from records by giving practical application for this purpose to one of science's greatest achievements—the photo-electric cell. As the result of lengthy research and experimentation, engineers have succeeded in reproducing what is really on the record by means of a beam of light. Among the advances made possible by this invention are a notable improvement in the tone and quality of phonographic reproduction and an increase of 900% in the useful life of records.

The basic idea and its development are the [*Continued on page* 147]



## Good For Costume Balls, Too!

THE "Sinushield," so-called by J. J. Van Vechten, San Diego mechanical engineer and its inventor, is a mask which fits the top of the face and is designed to aid sinus sufferers. By plugging into an AC or DC lighting circuit, it conducts a constant 140-degrees of heat to the affected area. The inventor, above, is shown holding the assembly parts.

# Real Air Conditioning

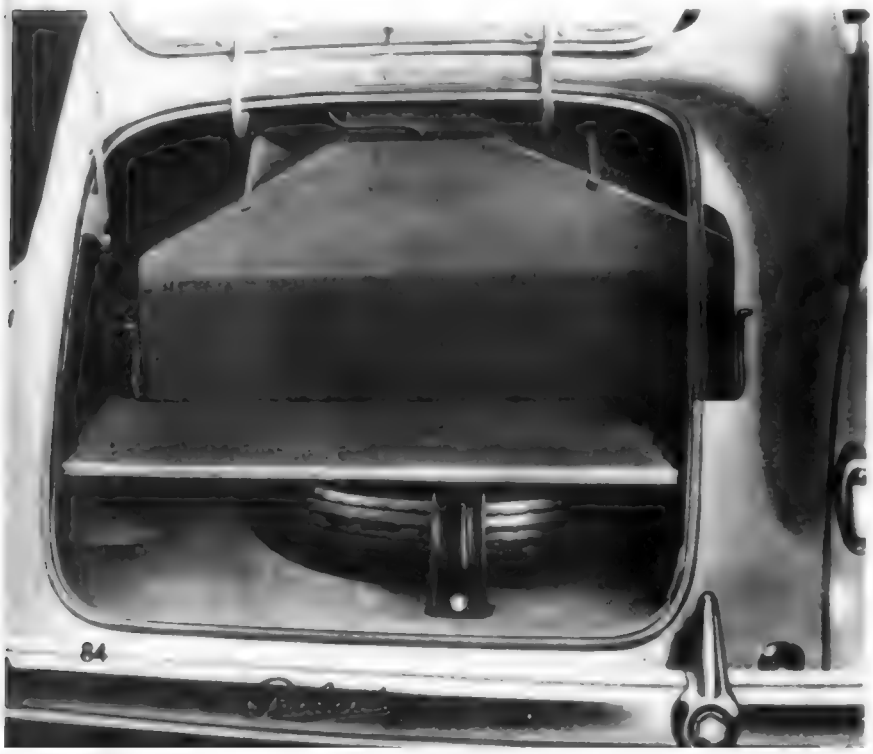
LONG a dream of the perspiring motorist, complete air conditioning has come into reality as a standard, factory installed, extra cost accessory on one of America's leading cars. No need now to drive at night to escape the heat or to swelter when heavy rains call for closed windows. No more getting out on the desert at 4 a.m. to beat Old Sol.

Several of the 1940 cars have been equipped with systems which furnish filtered air, heated or unheated, to the car, but this is the first time that refrigeration has been included. Creators of motordom's first real weather conditioning system for cars are not experimenting. There is no magic about the way Detroit has turned the trick. With plenty of surplus horsepower and ample space at the rear they have merely installed a compressor and condenser under the hood and put a refrigerating coil with blower behind the rear seat. It works in your kitchen; why not in your car?

When rear-engined cars come into the picture the refrigerating coil will go up front, while the compressor and condenser will find a place at the rear.

Installed in a car this system provides all-year comfort inside the car regardless of outside weather and temperature conditions. In summer the air entering the car is cooled, dehumidified, filtered and circulated. In winter filtered air that enters the car is heated by the conventional heating unit and is efficiently circulated. Hay fever victims can now find relief in motoring because car ventilation is obtained free from dust and pollen laden air. Dehumidified as it is cooled, car air is as comfortable on a humid day as any other time.

Knowing that the average kitchen refrigerator has only six cubic feet of capacity you may well ask if the new car



The unit that cools the air for the interior of the car is housed in the baggage compartment with ample room left

# for The Car

by
Frederick C. Russell

conditioner can really do a job. Can it! Here are the facts:

If you were to drive at 60 miles per hour the cooling capacity would be equal to placing one and one-half tons of ice in the car for melting in 24 hours. At 80 miles per hour the capacity increases to two tons. No question, therefore, of getting sufficient cooling in the lower speeds. Many travelers have found that even a little dry ice placed behind a blower will make a difference in car comfort.

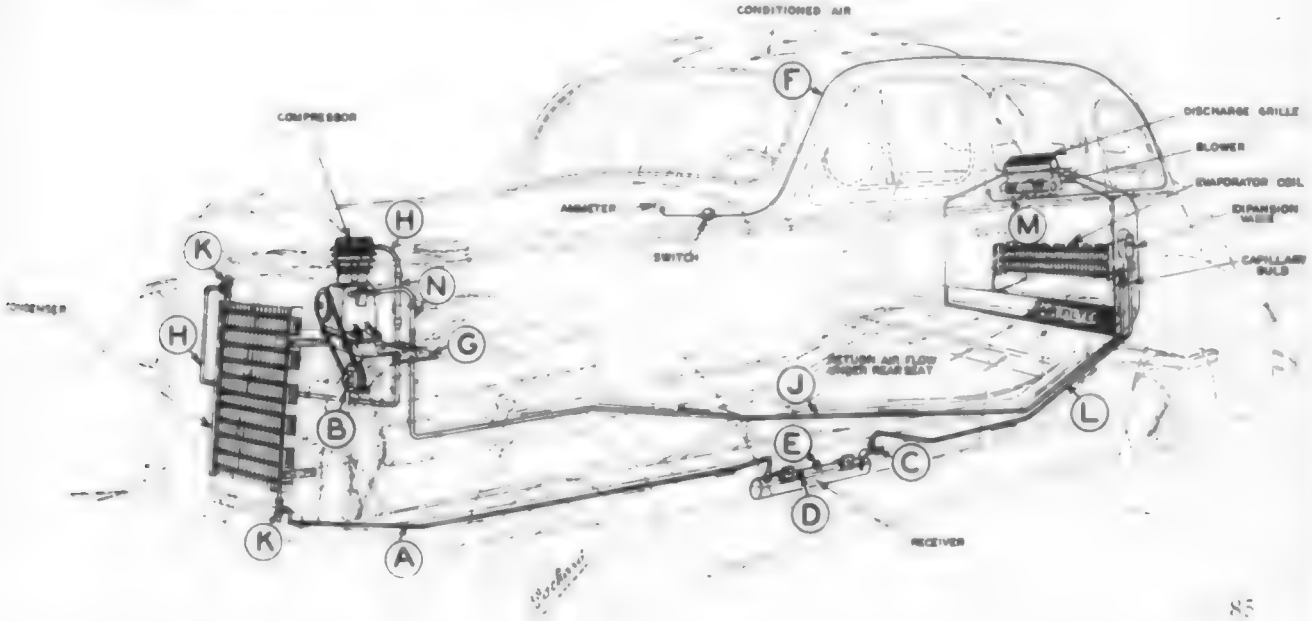
This capacity for bringing real relief to the motor party is due to development of a compressor that has triple the efficiency of an average home refrigerator unit. Yet it is no larger than the car's air filter and carburetor; actually smaller than the filters on some cars. Back of the rear seat is the blower which draws filtered air past the refrigerating coils and sweeps it into the car. This is a sirocco-type of blower electrically operated and regulated at the driver's will by a dial rheostat located on the instrument panel.

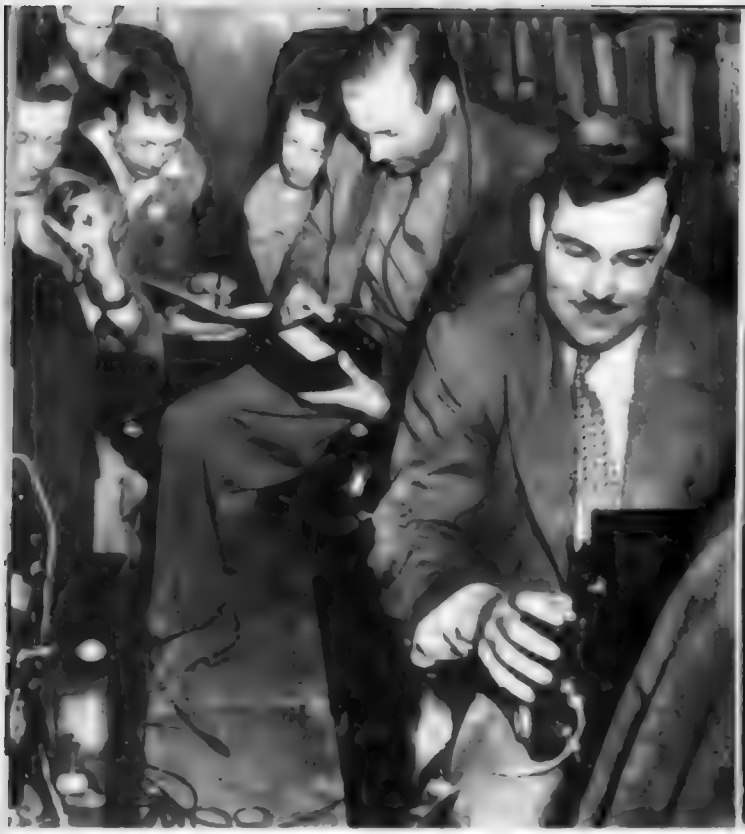
Cooling the air works like this: The blower

[*Continued on page* 146]

Above: The compressor unit mounted on top of an engine.

A. ½" dia. high pressure liquid line
B. Compressor take off pulley
C. Receiver shut off valve
D. Fusible plug
E. Liquid tester
F. Blower lead wire
G. Extra length cylinder head studs
H. ½" dia. high pressure gas line
J. ⅝" dia. low pressure gas line
K. Condenser shut off valve
L. ⅛" dia. high pressure liquid line
M. Blower ground wire
N. Vibration eliminators





The plane test magnograph is shown in action as Lockheed engineers describe tests by means of hand held microphone, throat mike and a box mike.

Below: The magnetic steel tape recorder—For perfect synchronization, it is played back at the same rate of speed the original sounds were recorded.

# New Planes Get the Tape Test

ACROSS the Southern California sky a new military bomber screams, five voices and 11 "focal points" of groaning stresses feeding their description of the test flight onto a steel tape. Mouth mikes, throat mikes and direct connections pick up the sounds. As the airplane descends, following an hour-long run, an engineer flips a switch, and the tape feeds back the entire story of the flight.

Known as the "planetest magnograph," the magnetic recording marvel was first used when a pilot tested the YP-38, twin-engine Lockheed interceptor-pursuit. As the plane dove 600 miles an hour, climbed, rolled, the pilot spoke his piece into a throat-type mike, through which only his voice was recorded. From several other points came the story of the metal's strains.

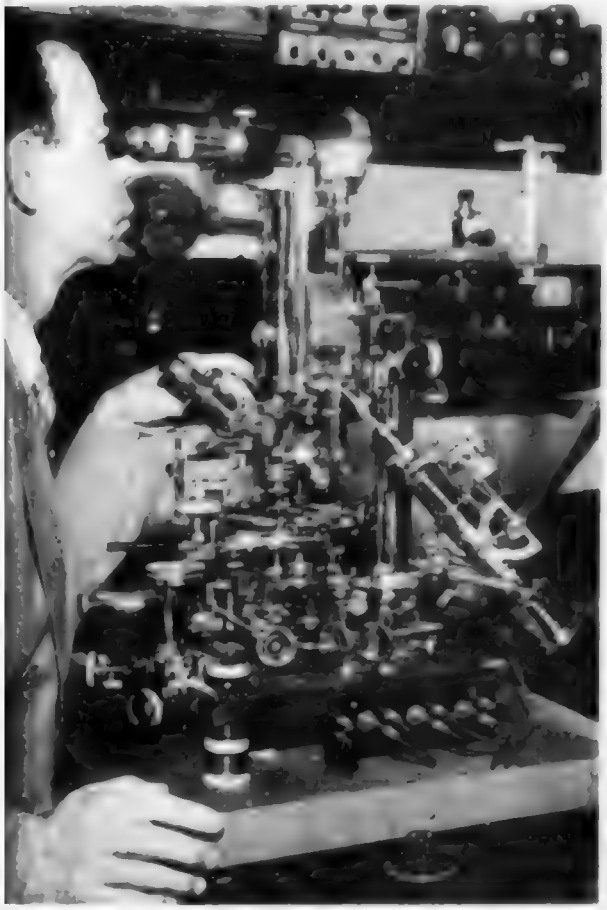
Four office secretaries take dictation from the steel tape through four magnetic channels simultaneously. The magnograph can record sounds from 16 different sources on the plane being tested.

The machine consists essentially of a steel tape and several magnets. When recording, each magnet transcribes onto the tape the noises from a single pickup. By turning control buttons, an engineer or pilot opens lines to the desired sound sources. The machine, designed by H. S. Heller, Los Angeles movie inventor, saves one-tenth the cost of test

[*Continued on page* 146]

## Bugs Can't Hide From This!

WITH this giant, complex microscope which he has invented and constructed in his laboratory workshop, Royal Raymond Rife, California scientist, hopes to unlock secrets of the bacteria world heretofore unknown. Capable of magnifying an object 31,000 times, the instrument weighs over 200 pounds and contains 5,682 individual parts. The trick is knowing how to work it!



## Wings Replace His Legs

GEORGE COPPING, of Seattle, lost both legs several years ago in an occupational accident. The loss looked as though it would deprive him of fulfilling his lifelong ambition of learning to fly, but it's hard to keep a good man down. Fitted with artificial legs, Copping started taking flying lessons. After more than 90 hours of flying, he qualified for his private license for land and seaplanes.

## Future Motorists Learn The Ropes

MANSFIELD, OHIO, is teaching its youngsters how to drive in traffic. At first thought it might seem a bit premature, but it is already showing results. They also learn how to walk across a street without getting run down. And the vital game of Traffic Safety is such fun that basic rules become second

[*Continued on page* 148]

## The Only Weather Woman

MRS. EDYTHE H. HENSEL of Santa Barbara, checks the readings of her back yard weather instruments. Reporting her observations daily to the U. S. Weather Bureau, Mrs. Hensel is the only woman weather expert in the nation to act in that capacity.

## Bomb "Tent" Won't Dent

SHIRLEY WRIGHT and John Boucher, two six-year-olds, seem to be thinking seriously as they sit on the front step of a Massachusetts bombproof. Shaped like a tent, it is made of quarter inch steel. It is designed to ward off flying debris but not direct hits. The bombproof is on exhibition in Quincy.

## They Don't Know What It Is

SOME Philadelphia sport fishermen caught this dainty morsel of marine life 45 miles off the New Jersey coast. Too big to be taken aboard the boat, the creature had to be towed in. Upon arrival, the monster (which weighs about a ton) put local fishermen and experts in a quandary.

It looks like a shark but it has no teeth. Authorities have been asked to name it if they can, but so far, no one has.

# MECHANIX ILLUSTRATED PHOTOGRAPHY SECTION

PAGES 89 TO 96

## PHOTO CONTEST

OUR monthly contest will be back again, beginning with the November issue of MECHANIX ILLUSTRATED! Its revival has been made possible by the addition of more pages to this magazine, thus bringing you a bigger publication each month with a larger photographic section—at no change in price!

Four cash prizes will be awarded each month, so get busy with your camera and send in unusual pictures of people, animals, airplanes, landscapes, etc. The three photographs shown here are reproduced to give you an idea of the type of pictures desired. These were selected from among winners in the Fifth Annual Newspaper Snapshot Awards Contest. The cat picture is by LeMar Mumbar, Pennsburg, Pa. Sifton Friedman, Philadelphia, Pa., made the child's photo. The landscape is by Thomas Carse, Scotia, N. Y.

Each month we will pay $10 for the best picture selected, $5 for second choice, $4 for third choice and $3 for fourth choice. Prints may be either glossy or matte finished and up to 8x10 inches in size. The following data should be on the back of each print: Your name and address, make and size of camera, type of film, lens opening and shutter speed and lighting conditions. Wrap prints carefully and include postage if you want unused prints returned. (Published pictures will not be returned.) Address all contributions to Photography Editor, MECHANIX ILLUSTRATED, 1501 Broadway, N. Y., N. Y.

# Enlarger For

Showing the 6x9 cm. enlarger in use, with your own camera in place. Notice the sturdy and finished appearance obtained by using the marine flag pole socket. A cut film holder supports the camera.

THIS efficient enlarger was primarily designed for 6x9 cm. cameras, although it can be adapted to other sizes by modifying its construction. It contains several novel features in the nature of the accessories used. These include a bracket from a steering post, a flag pole socket, an old oil can and a cut film holder. Your own camera serves as a bellows, and good projection is assured by using the lens in the camera.

The baseboard for this enlarger can be made to any desirable size, although the one shown measures 18x24 in. and is of ¾-in. plywood.

The upright standard on which the enlarger head slides is part of an old automobile steering column. Any pipe with an approximate outside diameter of 1½ in. is suitable. Although its length is optional, a 4-foot piece will permit sufficient enlargement for most purposes.

The base socket supporting the upright standard and the sliding member on the cross piece are both marine-type flag pole sockets, which are available from boat supply stores. When purchasing these sockets, take along the upright post to check the fit. The lower socket can fit snugly, but the upper one must slide freely on the shaft. The sockets should each be about 5½ in. long.

The wooden cross-arm supporting the lamp housing is of ¾-in. stock, 16 in. long and tapered outward from 4 in. at the post to 6 in. at the end on which the lamp housing and camera are attached.

The sliding bracket is attached to the cross arm and is locked in any desired position by means of a bracket used to attach the steering post to the dashboard of an automobile. The sliding bracket is brazed and the attachment is slipped over its end. Now drill the channels on the bracket to receive a carriage bolt to which has been soldered a large wing nut from an old style windshield.

A cut film holder is screwed to the underside of the cross-arm to hold the camera. The window cut in the holder measures 2¼x3¼ in. This holder fits directly under a 3½x4½-

# 6x9 cm. Cameras

by Philip Confalone

in. window cut in the cross-arm (see drawing).

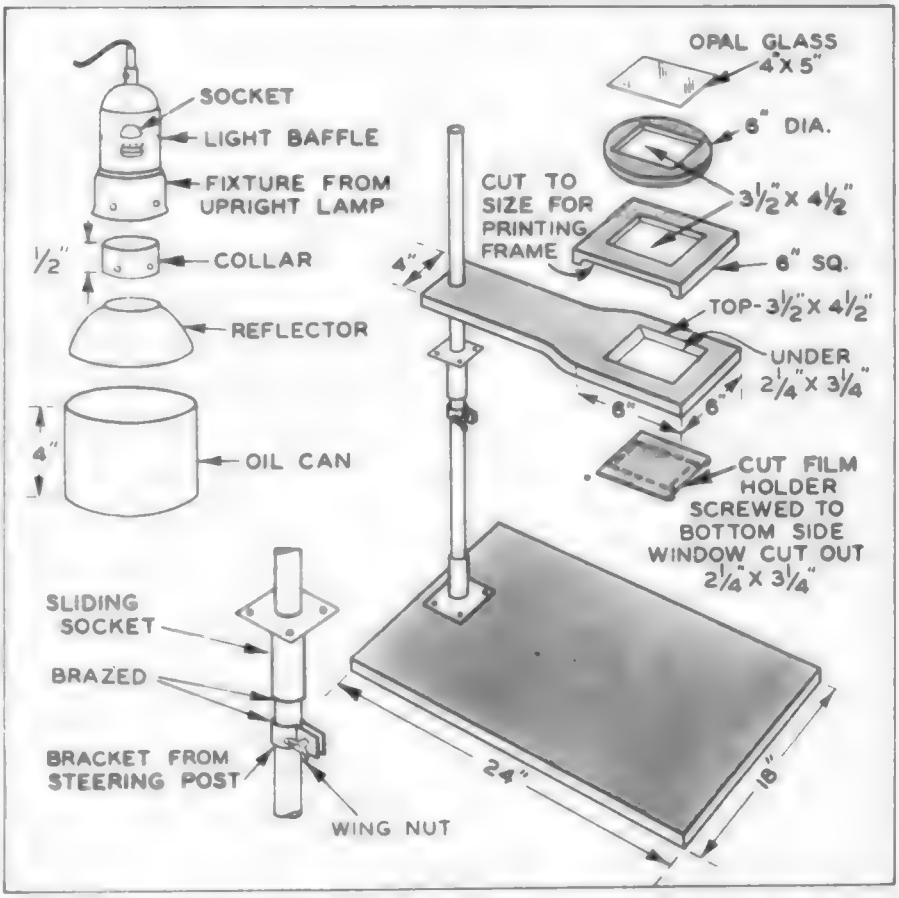
The negative carrier fits over the window in the cross-arm. It is converted from a $3\frac{1}{2}$x$5\frac{1}{2}$-in. printing frame, with the back part discarded and the springs removed. The negative is placed between the glass pieces in the printing frame.

The negative carrier sets into a 6-in. square block of wood, recessed to receive it. Naturally, the size of the window in the block depends on the outside dimensions of the negative carrier being used. The window in the one shown measures $3\frac{1}{2}$x$4\frac{1}{2}$ in. This assembly attaches to the top side of the cross arm.

With the negative carrier set in the recessed window of the square block, a second piece, circular in shape, is cut to fit over the negative carrier (see drawing). This circular block has a window cut a little larger than the size of your film, and the diameter of the circle is cut to the diameter of the oil can being used. In this particuar block, the window is $3\frac{1}{2}$x$4\frac{1}{2}$ in. Over the window is a piece of opal glass held down by four screws along the edges.

The oil can lamp housing fits over the circular block (see drawing).

[*Continued on page* 147]




**Above: All construction details for building this enlarger are given in the drawing. Note the simplicity of the lamp housing assembly. All parts of the cross arm and negative carrier are shown with dimensions. Below: The completed enlarger, partly disassembled.**

# STUDIO and DARKROOM

ABOVE: The brass tube over which this copying arm slides is 6½ in. long and is cut to a 60 degree angle at one end. Solder a ⅛ in. sheet of brass to beveled end and tap for ¼-20 tripod screw. See insert sketch for details.

ABOVE: Three pencil-type typewriter erasers, inserted in holes drilled in a board, make a quickly assembled table top tripod. A ¼-20 stove bolt locks the tilt head to the board.

ABOVE: The possibility of chemical fog can be eliminated by adding desensitizer to the developer (use green for pan film). Mix 2 oz. to 80 oz. water and use a half teaspoonful in a tank of developing solution.

ABOVE AND LEFT: Small negatives in large holders can be used as shown. Notch an old negative as illustrated. Slip a new negative into the notches and place in holder. See assembly on left.

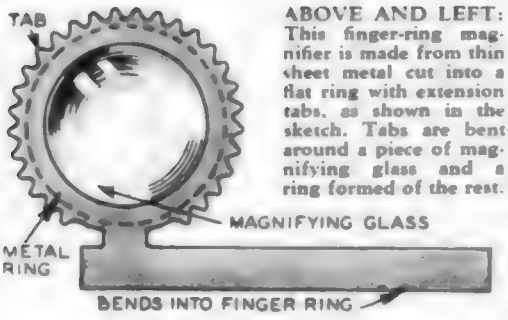
RIGHT: Wooden boxes make handy ready-made double shelves for a darkroom. The boxes should be turned on their sides with the bottoms to the wall as shown.

# AIDS for PHOTO FANS

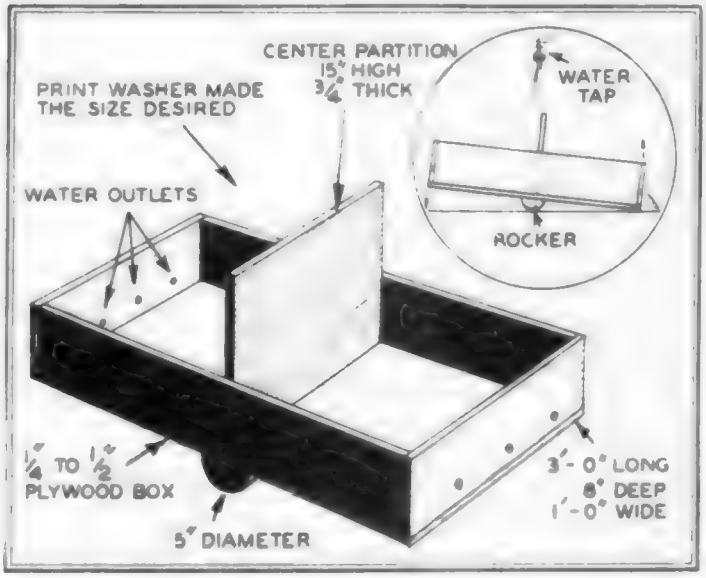
ABOVE: Prints can be kept flat by rubbing with equal parts of glycerin and water after being placed face down on ferrotyping trays and squeegeed.

ABOVE: Two ordinary stove pipe elbows fitted together make an excellent darkroom ventilator. Set one end into the wall as shown. No light from outside will penetrate this ventilator-light trap.

ABOVE: Linoleum cement is excellent for mounting prints. It is waterproof, dries quickly and holds permanently on all types of photographic mounts. Cost is about 40 cents per quart.




ABOVE AND LEFT: This finger-ring magnifier is made from thin sheet metal cut into a flat ring with extension tabs, as shown in the sketch. Tabs are bent around a piece of magnifying glass and a ring formed of the rest.




RIGHT: The rocker print washer is made of plywood or white pine according to dimensions given in the drawing. The rocking element at the bottom of the unit is a block of wood. Drill holes in each end of the pan for escaping water. Finish with enamel.

# Blondes From Brunettes!

The brunette to blonde transformation is quickly done on the negative with a dab of the chemical.

by
Stuart Allan

HERE is an opportunity for you to change your girl friend from a brunette to a blonde; that is, for photographic purposes. It's a simple trick, and it's not accomplished by using peroxide. Here's the answer:

Witness the two pictures on this page. The one on the far right is a straight print from a negative taken of a girl with deep brown hair. The other shows the same girl as a blonde. Here's the way the transformation was accomplished.

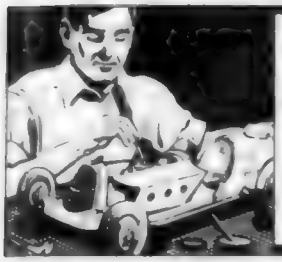
Above are the before and after results of using the New Coccine. Note how effectively the tone of the hair was changed at left.

There is a pink dye sold at all photographic dealers known as *New Coccine*. This dye, when dissolved in water, can be applied to a negative so that local areas can be held back in printing, making it possible to control the print tones at will.

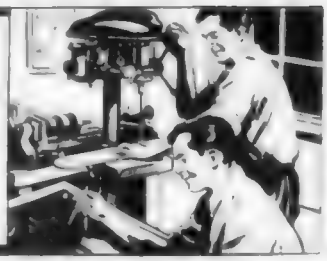
The dye is best dissolved in three different concentrations so that it can be applied to a negative according to the amount of control desired. The application is made with a small camel's hair brush or by means of a cotton stump. (A simple way to make a cotton stump is to sharpen the end of a candy stick and twist a small piece of cotton around this end.)

The dye can be applied to the emulsion side of the negative or to the back gelatine-coated side. In this instance the dye was applied to the back side of the negative in the hair portions and around the brim of the hat. When dry, the print is made in the usual manner.

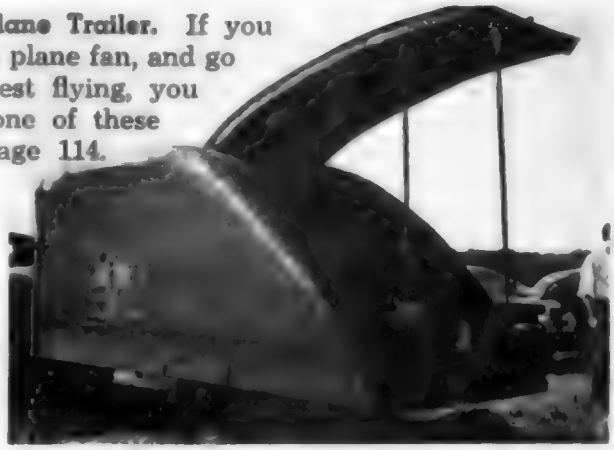
Later, all dye can be removed from film.



# How to Build SECTION



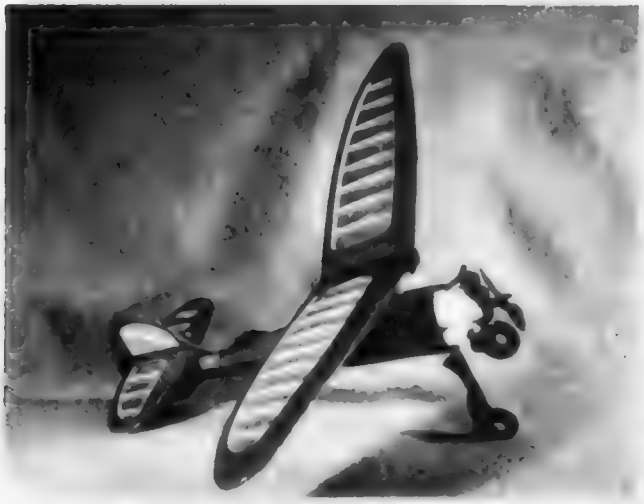
**Model Airplane Trailer.** If you are a model plane fan, and go in for contest flying, you will want one of these trailers. Page 114.



**Lighthouse Lamp.** Novelty lamp with nautical theme. Page 126.

**IN THIS ISSUE**

**Pictured here are a few of the *selected* projects you can build from MI plans and instructions.**



**The Pocketeer.** A super-performing miniature two-in-one model plane. See page 108 for complete details.

**Walnut Ring Table.** Simple design in a sturdy, handsome coffee table. Ideal project for beginners. Page 105.

**Bonnie.** Second installment of the plans and article telling how to build an 18-ft. auxiliary plywood cruising sloop. Page 96.

# BONNIE, 18-Ft. PLYWOOD

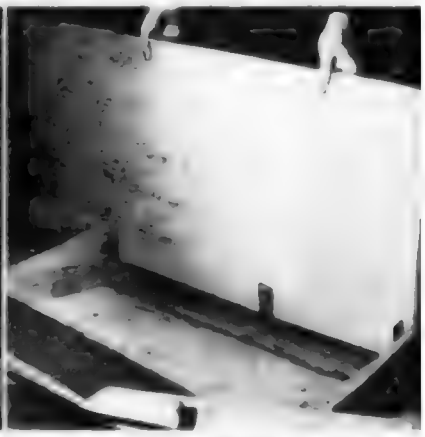
by Roland Cueva, MI Boating Editor

LAST month's article covered construction of the hull up to the point of turning the boat rightside up and resting it in its cradle. We are now ready to cut away the temporary cross-braces, and proceed with the installation of the centerboard trunk, decks and cabin.

### Centerboard Trunk

Start by cutting off the parts of frames 3 and 4 which extend above the sheer, together with their cross-braces. If your cradle was properly built and the hull firmly supported you need have no qualms about climbing around inside the boat. Care must be taken, however, not to step on the planking, and it is well to place boards on top of the frames to avoid this possibility.

You now have a clear space around the centerboard slot in which to work. With a small saw cut through the two frames and floor beams which cross the slot, ¾-in. away from the slot on either side. This allows the trunk sides to come down flush against the keelson, and at the same time gives clearance for the frame bolts. The trunk may now be cut as indicated in the drawing and photos.



Below, left to right: Sections of centerboard trunk ready to be assembled; view showing how floor frames are cut through in way of slot; lifting one side of trunk into place for fitting. Bottom: Cabin complete on outside except for doors and hatch. Other photo shows forward deck framing and mast pardner.

# SLOOP

Part II

Above: *Bonnie* does not have to be build next to the water as she can easily be transported by trailer even for considerable distances. Left: Screwing down the side decks. Below, left: The aft king post in the centerboard trunk is sawed off flush with the top; the forward one extends up to the cabin roof. Center: Fitting in the deck longitudinals. Right: Foredeck being covered. Note side supports for cabin in foreground.

Be very careful in shaping the bottom as it must be a perfect fit on the keelson if it is to be watertight. Also be sure to paint the insides of the trunk with four coats of bottom paint before assembling as this task will be impossible afterward. Use 1½-in. No. 10 screws to fasten the bed logs to the sides, driving them from the plywood into the oak. Now place one side of the trunk in position on the keelson and run a pencil around the base of the bed log. Remove the side and drill holes through the keel and keelson for the hold-down carriage bolts. Drill corresponding holes through the bed log. Follow the same procedure for the other half of the trunk. Cut a canvas gasket to fit over the slot, and bed it down in liberal quantities of liquid marine glue. Put the trunk sides with their attached outside supports, back in position and ram down the end pieces, or king posts. The forward post must stick up well above the top of the trunk so that it may later be tied in to the cabin roof. Screw the end posts tightly in place from both sides of the trunk, using 1¼-in. No. 10 screws. Run the bed log bolts up through from the outside, and tighten them with nuts over washers from the inside until the glue begins to squoosh out between bed logs and keelson. Bore a ¾-in. hole for the centerboard pin in the position indicated in the drawings.

The centerboard itself may be installed at this time or later, as desired. In any case, the installation is very simple. Lower the board into the slot with cords and maneuver

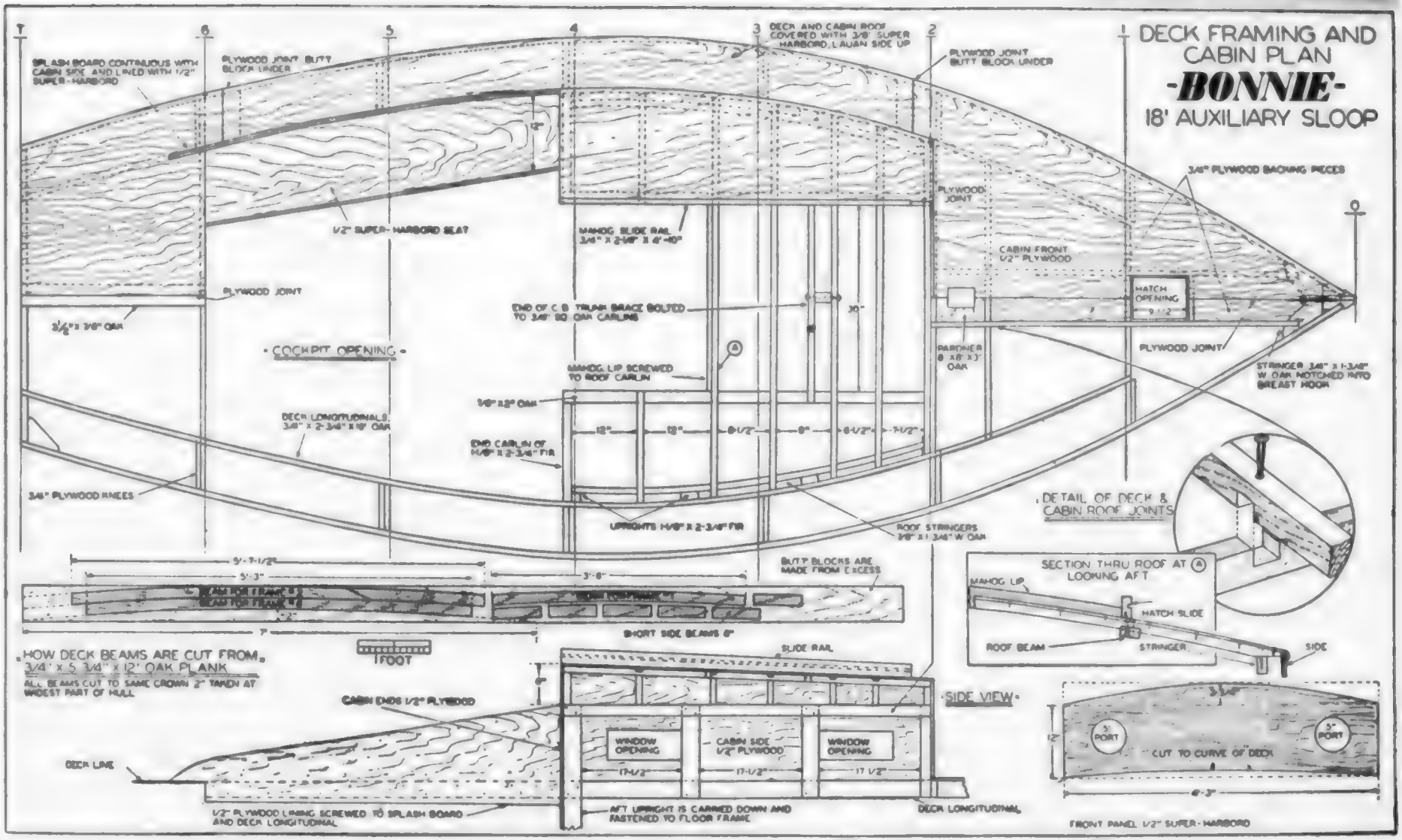
Left: Roof carlins of cabin are in place and plywood top goes on next. Above: Closeup showing centerboard end post bolted to cabin roof, and window opening cut out.

it until the hole in the board lines up with the hole in the trunk. Push the ¾-in. pipe through the holes (set in white lead) followed by the half-inch bolt, which goes through the pipe. A rubber and iron washer is used on either side, and when the nut is tightened up the assembly should be permanently waterproof, and cannot bend in the trunk sides. The centerboard raising pendant, of 3/16-in. galvanized wire rope, must, of course, be attached to the board before putting it in the trunk. Close the top of the trunk by screwing down a piece of ¾-in. plywood, with a hole in it for the pendant. A block goes on top of the cover board, through which the pendant is run. This cover board may be used as a table later on by hinging side pieces to it, with collapsible brackets for support when raised.

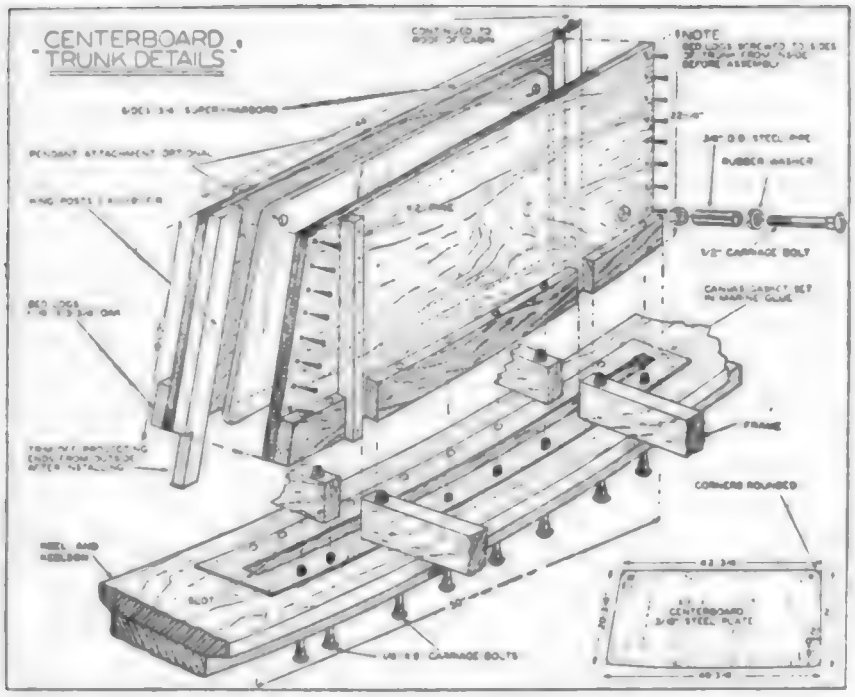
## The Decks

Cut off the remaining projecting frames at the sheer line and plane down whatever plywood edges stick up until they are flush with the sheer battens all around. The deck beam knees of ¾-in. plywood may now be cut. At frames 1, 2, 5 and 6 they can be triangular in shape, extending about 8-in. down the frame sides and another 8-in. out along the deck beams. Frames 3 and 4 show inside the cabin so you will want the exposed edges cut in a graceful curve rather than straight. Do this with a jig saw, making the curve to your liking. Clamp the knees to the tops of the frames, placing them on the same side as the gussets and floor beams, and screwing them in place

Portlights are installed in front of cabin as above, set in white lead so they won't leak. These ports are very useful as a means of ventilating the cabin on hot days or nights. At right is the remaining hardware needed. Pieces are as follows: 1—Mooring bitt. 2—Sheave for masthead (takes main halliard). 3—Sheet traveler. 4—Stem head plate. 5—Cleats. 6—Centerboard block. 7—Jib halliard and main sheet blocks. 8—Headboard snap shackle. 9—Main sheet block. 10—Stern chock. 11—Gooseneck. 12—Chain plates. 13—Bow chocks. 14—Clew outhaul. 15—Lip leaders. 16—Rudder gudgeons and pintles. 17—Turnbuckles for rigging.




**Top, side and front views of deck and cabin framing. Before covering these parts with plywood it is a good idea to make paper patterns of the areas to avoid waste.**



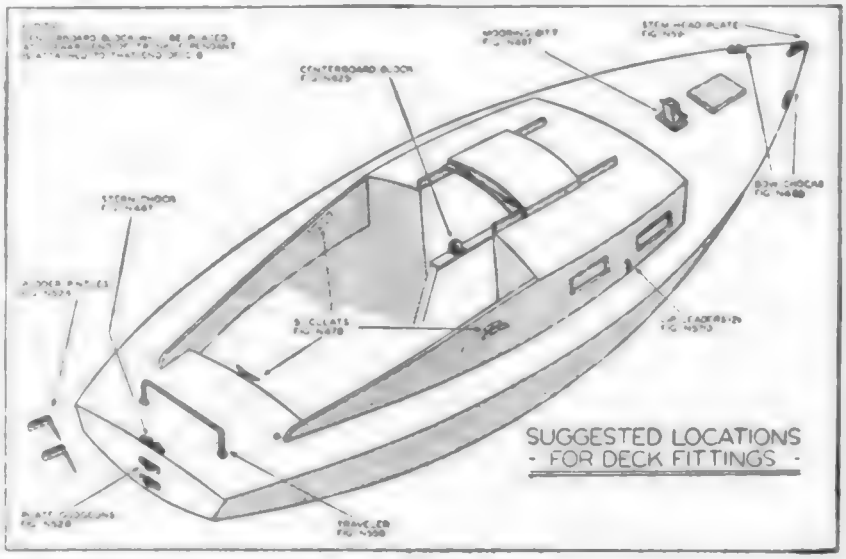

Dimensions and assembly details of centerboard and trunk are shown above. The bed logs are held to the bottom of the trunk sides by means of screws driven from the plywood into the oak. Paint insides thoroughly before assembling.

with 1½-in. No. 10 screws. There are three full length deck beams and three short ones under the side decks—these are all cut from one 12 foot oak plank, as indicated in the deck plan drawing. The beams are clamped, one by one to the knees, with their outer ends butting up against the frames, and screwed in place. Run the screws from knee into beam, using about five at each end of the beams. Plane off any bumps or irregularities until all the beams flow smoothly from sheer to crown.

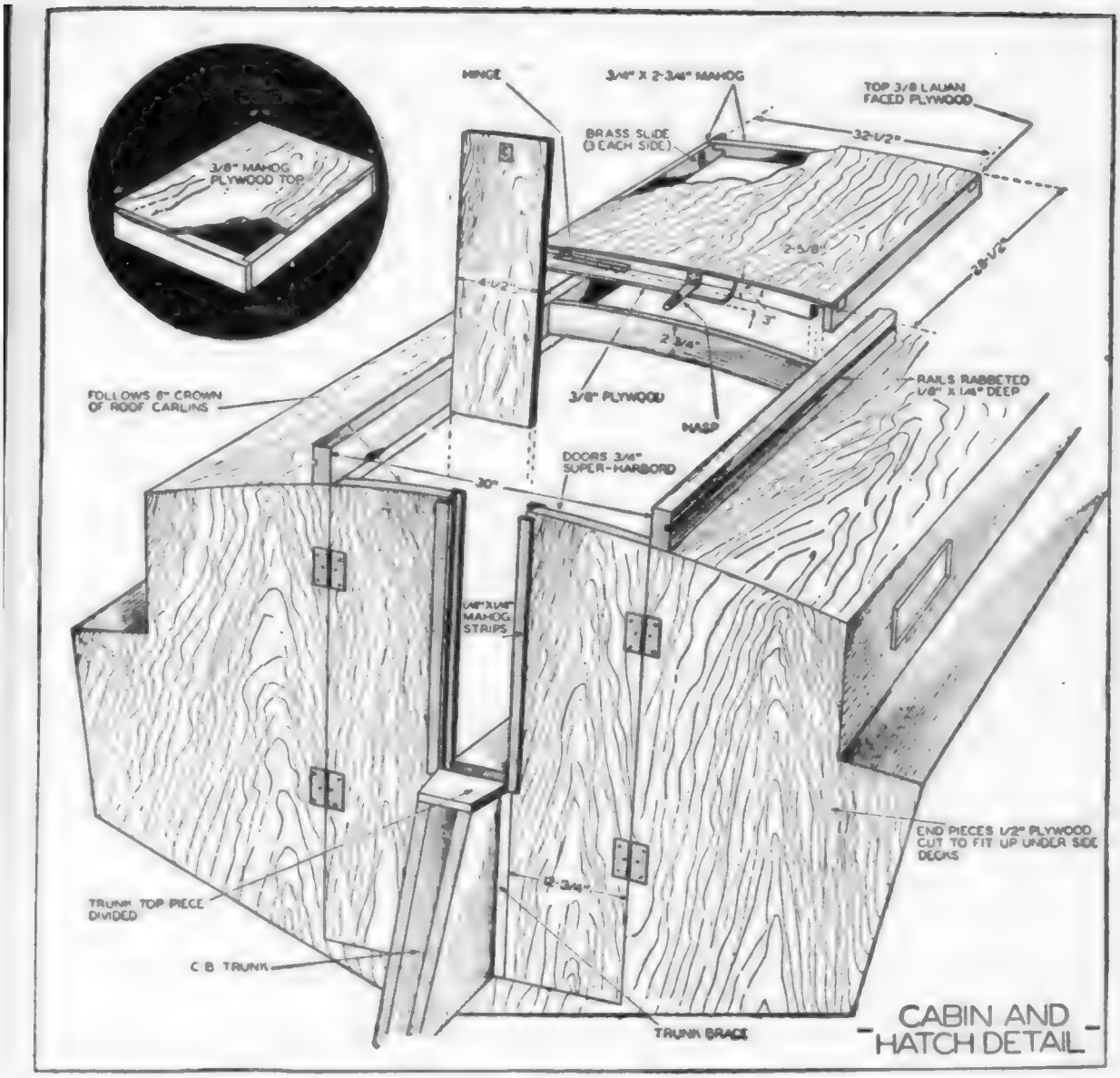
Next, bend in the two longitudinals that form the main fore and aft supporting members of the deck and cabin. These are notched into the deck beams, as shown, and also into the transom frame. They run in a continuous sweep from Frame No. 1 to the transom. At every deck beam the longitudinals are fastened with one screw—more than one is unnecessary and undesirable.

Four smaller pieces constitute the remaining deck framing, one at the middle of the after deck, and three in the fore deck. All should be notched into their supporting members and fastened with one screw at each joint. The positions of these members are clearly shown in the deck plan. The mast pardner must be cut out to take the mast, and an opening 3½x4½-in. is made for that purpose, allowing ample room for wedging when the mast is stepped. The pardner fits in a well between four members of the deck framing, and is fastened to the two fore and aft pieces by means of lag screws driven from the beams into the pardner. Thus it is braced securely on all sides and cannot possibly slip or work out of position. A small forward hatch opening is provided just forward of frame No. 1. Three sides of the hatch are already formed, and it is merely necessary to fasten a cross piece between the fore stringers to create the fourth side. The ends of the latter, by the way, are notched and screwed into the breast hook. Place an upright brace under the center of the deck beam at frame No. 6, securing the lower end to the floor beam with screws. No other braces are needed under any other part of the deck, which is now ready to be covered.

The covering comprises six sections: two




The deck fittings may be placed as indicated. Numbers refer to catalog of Armstrong & Galbraith, New York City.



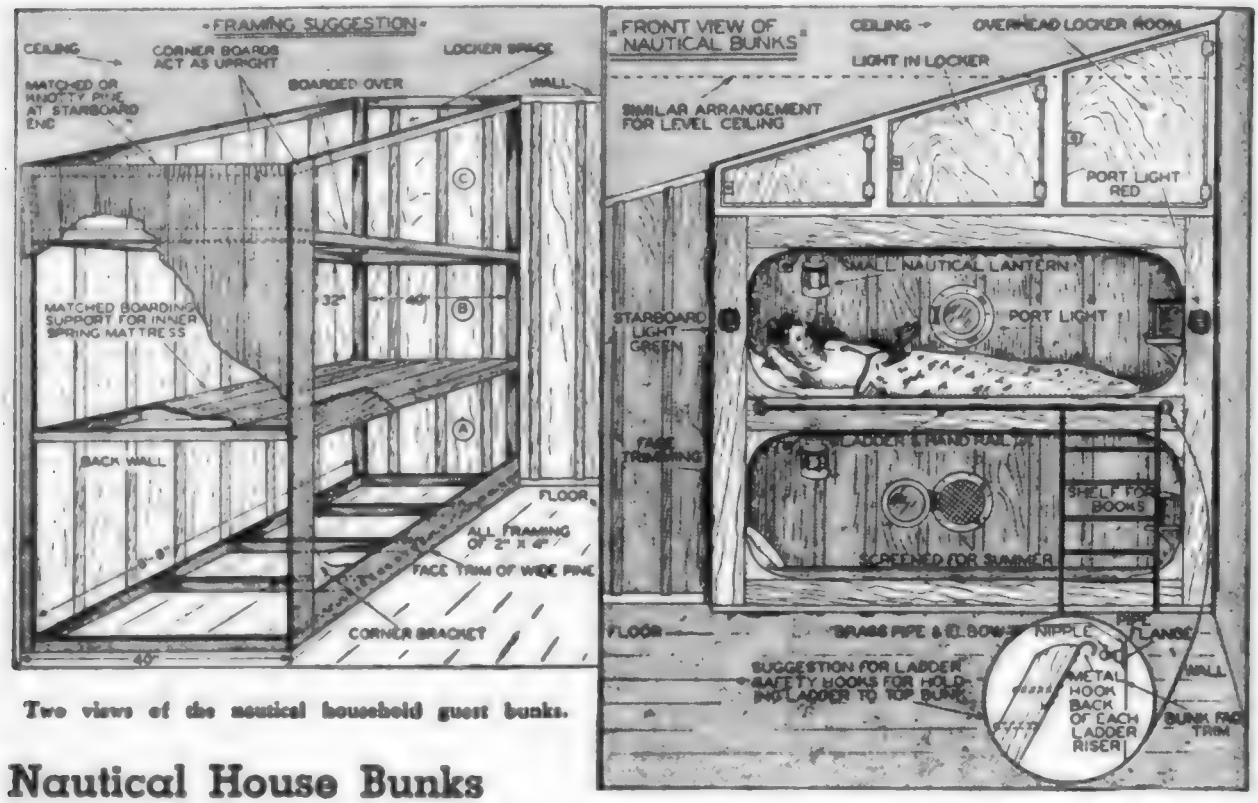

By comparing this drawing with the photograph on page 96, a clear conception of the end construction of cabin may be obtained.

forward, one on each side and two aft. Three panels of ⅜-in. mahogany faced Super-Harbord are used (see Bill of Materials in last month's installment) for decking material, and to avoid waste it is well to make paper patterns of the deck sections before cutting the plywood. It will only take an hour or so to make the patterns, using your building paper, and they can then be placed directly on top of the panels and shifted around until the best cutting arrangement is reached. The plywood goes on the deck very easily, and is fastened down with 1-in. No. 8 flat head brass screws. Space the screws about six inches apart and turn them in just flush with the mahogany surface. The decks are to be stained and finished bright, so they will need no canvas or other covering. Oak butt blocks are placed under the side deck joints, and ¾-in. fir plywood filler pieces back up the joint in the foredeck between the stringers. The after deck joint is automatically taken care of as it occurs over the center frame piece. Run Kuhl's seam compound for the deck (gray or mahogany) into the seams. It is well to stain the deck and apply at least one coat of varnish right away as protection. The stain, which is also filler, may be obtained at any marine supply store in light medium or dark shades. Take your choice and follow the application directions on the can. As soon as the varnish has dried you can start work on the cabin.

### Building the Cabin

Construction of the cabin has been kept as
[*Continued on page* 149]

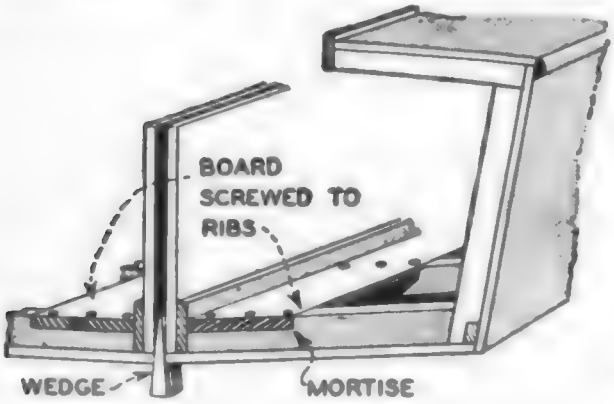
# FOR BOATING ENTHUSIASTS




Two views of the nautical household guest bunks.

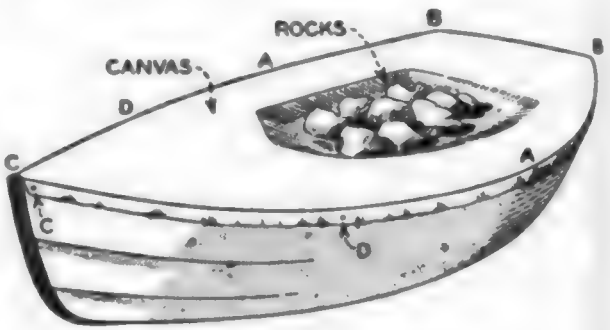
## Nautical House Bunks

FOR the yachtsman who can't feel at ease in his home unless it has the atmosphere of a boat, this set of nautical bunks should be the answer. Panel work is of plywood with supporting framework of the dimensions shown in the drawing, chiefly 2"x4". The general design may be slightly altered to fit the room in which the bunks are to be installed. Very attractive jobs can be done in the attic storeroom by taking advantage of the "ship shape" slope of the roof. The height of the bunks should be maintained as indicated in order to permit a comfortable attitude. If a window is available at the location of the bunks, portholes can be cut in rear panel.—*L. B. R.*




## Installing Deck Canvas

A GOOD way to make a tight deck canvas job is shown below. Remove old canvas and coaming. Then coat the deck with canvas cement and tack canvas around outer edges, stretching tightly. Stones over cockpit tighten for inner tacking.—*G. E. B.*




## Curing Warped Trunks

OCCASIONALLY in light centerboard boats the opening in the bottom of the centerboard trunk becomes narrowed by stresses on the hull. To correct this trouble, drive a wedge into the narrow section to spread it. Then mortise heavy planks in bottom frames along trunk as shown.—*G. E. B.*

## Canvas Lined Centerboard Trunk

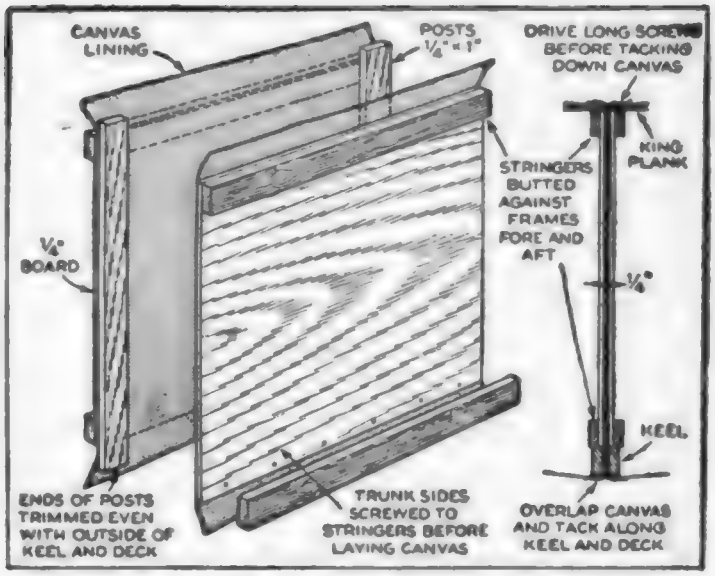
AN ORDINARY trunk set into the narrow keel of a kayak will often strain and leak, because it's almost impossible to get a solid joint. On this trunk, the longitudinal stringers are screwed to frames fore and aft of the trunk and hold it rigid, while the canvas lining takes care of possible

[*Continued on page* 152]

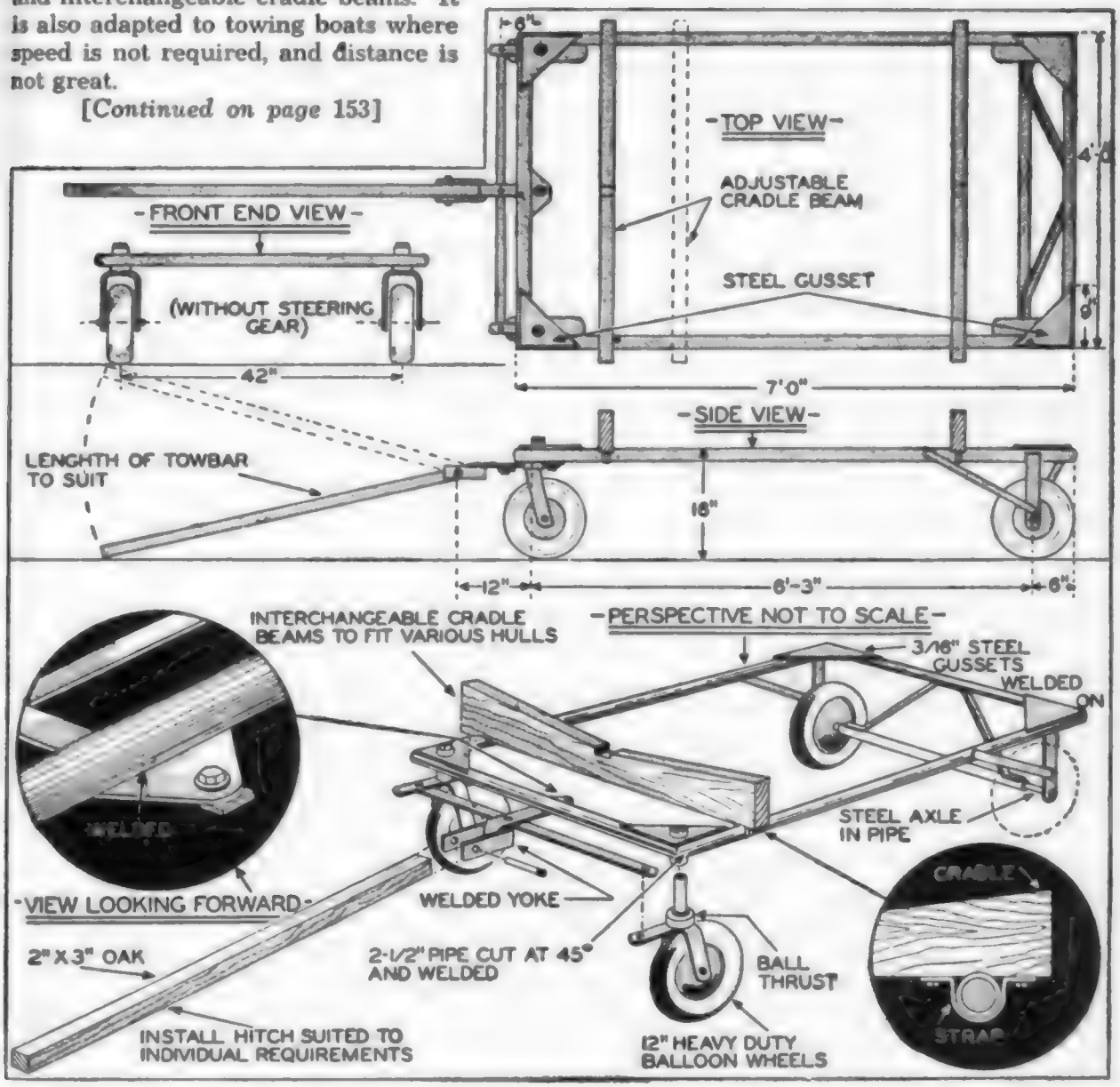
## A Simple 4-Wheel Boat Trailer

THIS handy boat truck, is convenient for handling several types and sizes of hulls, having adjustable and interchangeable cradle beams. It is also adapted to towing boats where speed is not required, and distance is not great.

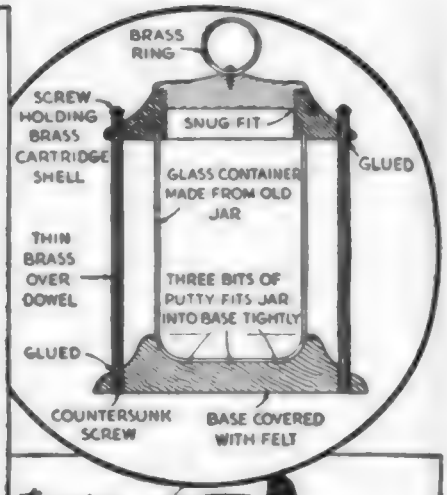
[*Continued on page* 153]




**Below: Several views of the handy four-wheel light boat trailer.**



# A Lantern Humidor



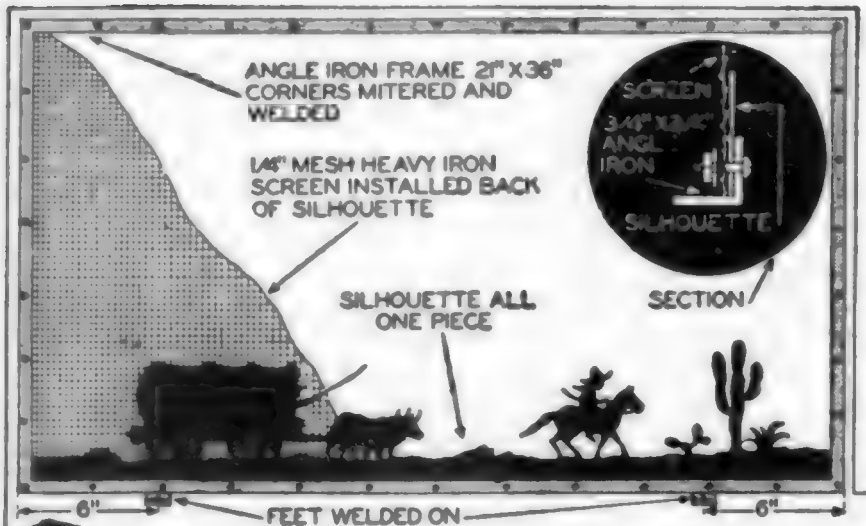
REPRESENTING an old marine lantern, this tobacco humidor of walnut and brass may be made by anyone having access to a lathe. An old pickle jar is used for the lantern's globe. To remove the top of the jar, lay it upon a vee block and holding a glass cutter stationary, revolve the jar slowly until there is a complete cut around the outside. Take the ball end of the cutter and tap the inside of the jar lightly. The glass will break smoothly around the cut.

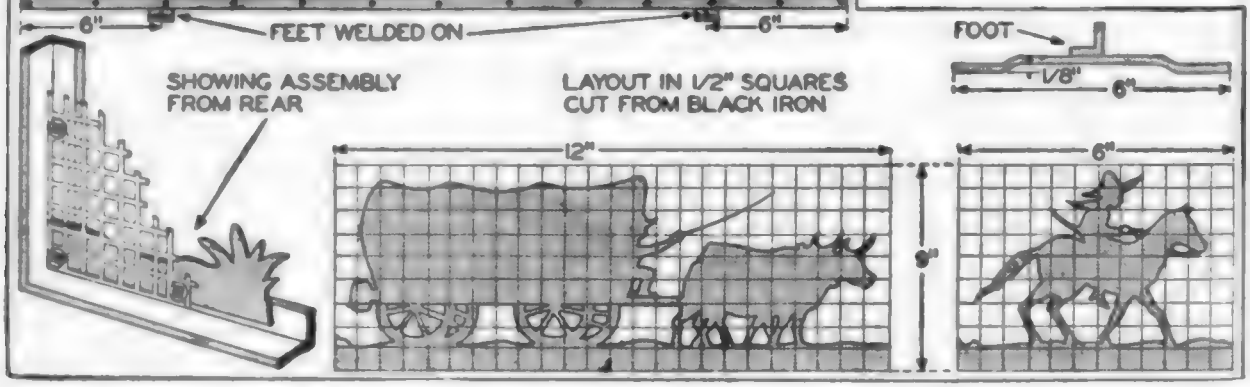
Place a walnut disc, 6" in diameter and 2" thick upon the face plate of the lathe and turn out the base. Fit the bottom of the pickle jar snugly inside.

For the lantern top, use a similar disc. First cut out the hole through which you reach the tobacco.

[*Continued on page* 155]

# Santa Fe Trail Fireplace Screen




THIS unusually effective fireplace screen can be made very inexpensively. The silhouettes are cut from sheet iron either with a metal cutting jigsaw or with a hammer and chisel. The latter method requires file trimming. The feet are welded to the frame, the corners of which are also welded. Overall dimensions may be varied to suit the fireplace to be screened.—*H. S.*

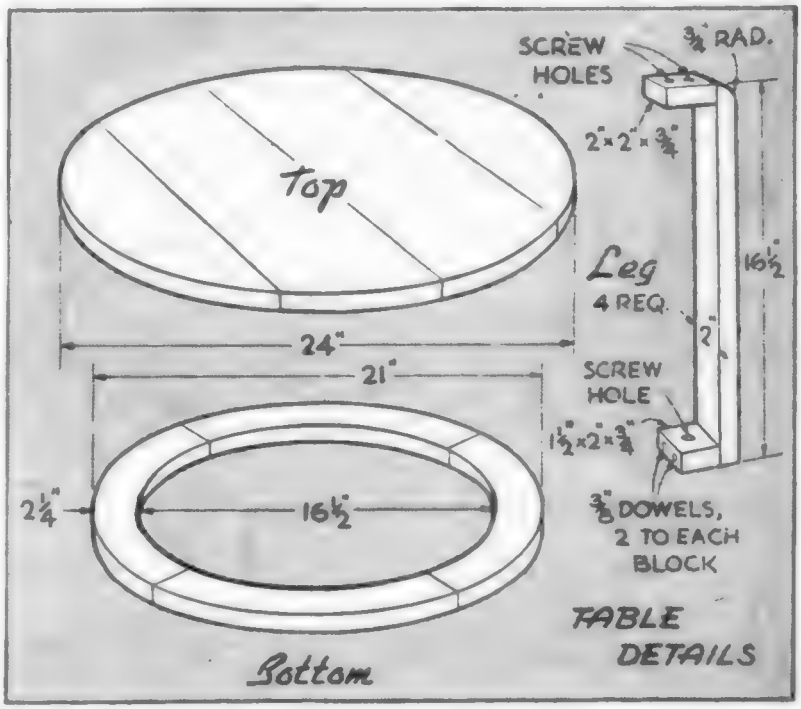
# A MODERN RING TABLE IN WALNUT

by Dale Van Horn

**Today's trend toward simplicity in design brings the production of excellent and conventional furniture within easy reach of the amateur craftsman. This artistic ring table combines ease of construction with good taste.**

THIS walnut ring table is an excellent project for the not-too-far-advanced craftsman to tackle who wants a useful, good looking piece of furniture to add to the home. Modern in styling, simplicity is the keynote. Just 6 parts are required. They are the top, the bottom ring and the four legs.

Glue 3 or 4 planks of surfaced walnut ¾-in. thick to make a square slightly exceeding 24-in. on a side. The adjoining edges will be best provided with dowels as well as glue. A good job of clamping, laid on a flat surface will assure smooth joints.



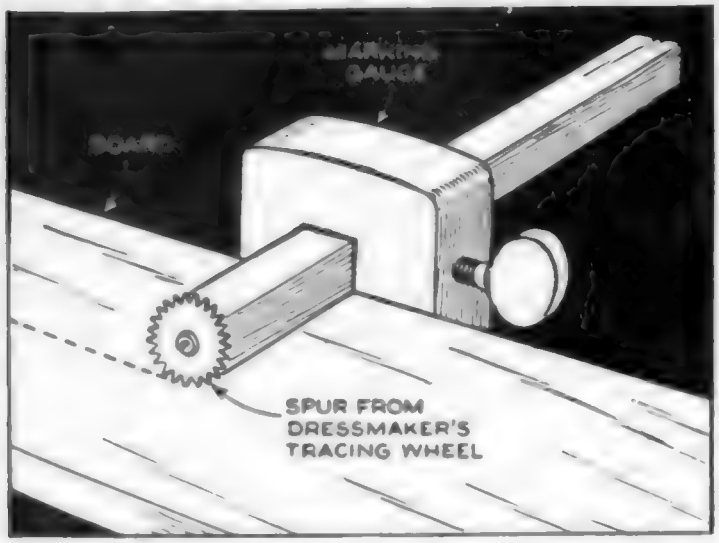

**The illustration at the upper left shows the correct method of making the final assembly of the table. Care must be taken that the screws are not too long or they will come through and mar the table top. Drawing directly above shows details.**

Saw top ⅛-in. oversize, then with a sanding disc or block, sand the edges smooth. Glue four ¾-in. boards with mitered and doweled corner joints wide enough to permit scribing the ring shown. This has a 16½-in. inside diameter, an outside diameter of 21-in. Sand the outside edge with the sanding disc, the inside on a drum sander. If machinery is not available, sand by hand.

Make up four legs 2-in. wide and 16½-in. long from the same ¾-in. stock. Glue and dowel the blocks shown to each end and sand the one edge of each leg to a ¾-in. radius. These go at the bottom. Fill both the top and bottom of ring and table top and all sides of the legs. Filler on even unexposed surfaces will prevent the wood from being affected by atmospheric changes and thus prevent warping. Now give a good coat of sprayed lacquer on all exposed surfaces. Rub down with No. 000 steel wool. Rub down the top with No. 000 sandpaper under a flat block of wood and give the top surface another sprayed coat which is then lightly sanded, then steel wooled and finally waxed. The steel wool and wax are also applied to all exposed surfaces.

To assemble, bore holes through the leg blocks and then turn in screws not quite long enough to go through top and ring. This assembly raises the ring ¾-in. from the floor. The construction is unusually rigid. If desired, a band sawed spreader may be placed between each pair of legs just under the top to create a firmer impression to the eye. This is sawed ¾-in. thick and dowelled into place.

# SIMPLE SHOP KINKS

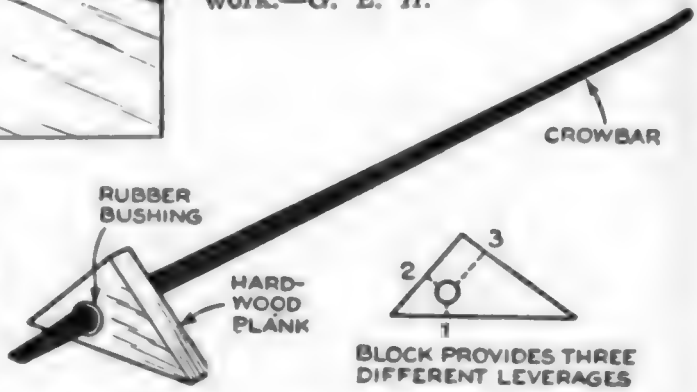


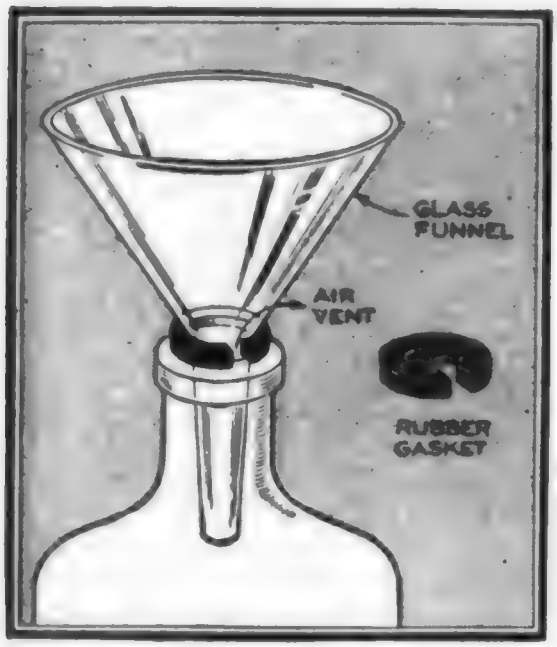

## Handy Marking Gauge

A DRESSMAKER'S marking wheel attached to the end of a marking gauge will not be deflected by the grain of the wood as a pencil is in marking.—*G. E. H.*

## Crowbar Lever

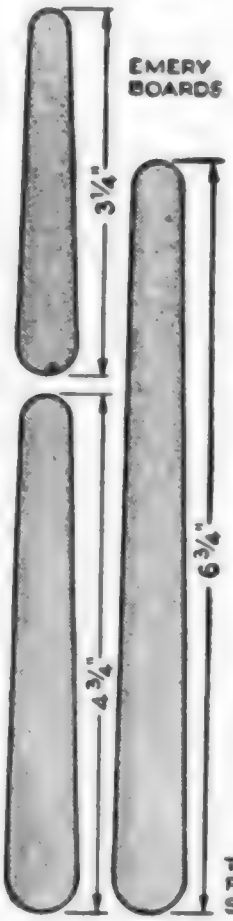
A TRIANGULAR hardwood block drilled as shown, is a great help when working with a crowbar to lift heavy objects. The hole in the block is drilled to fit snugly so as not to slip in use. The distances from the hole to the sides of the triangle should be in the ratio indicated. The size of the block should be suited to the length of the crowbar and the weight of work.—*G. E. H.*



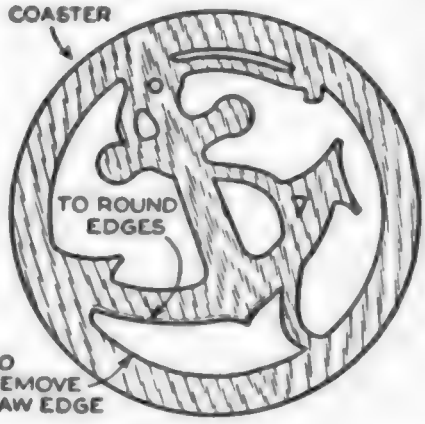

## Rubber Funnel Stop

A SMALL rubber gasket, or washer, cut on one side is a good funnel stop. It is slipped around the neck of the funnel when the funnel is to be inserted in the bottle. In pouring, the cut is air vent.—*G. E. H.*



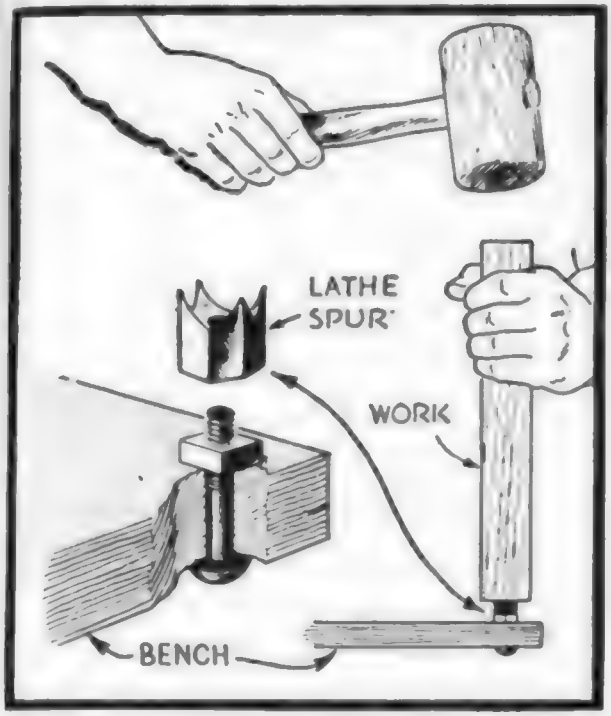

## Manicures For Filigree Work

THE little emery boards used by manicurists for the care of the fingernails can also be used by the craftsman to secure a fine finish on delicate filigree work. With them, it is possible to sand the edges of a scroll saw design without scratching the surface, or face, of the work.—*B. M. I.*



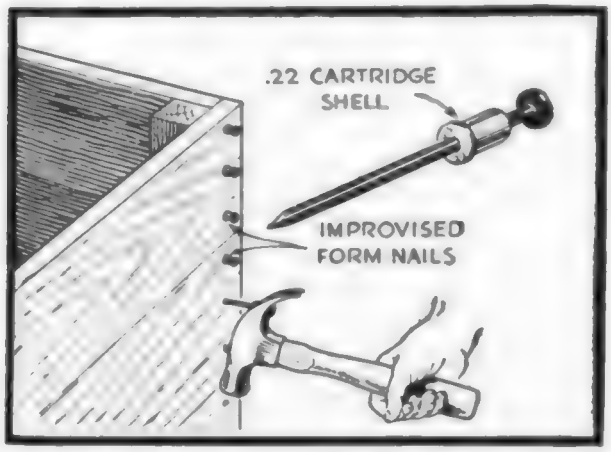
## Centering Lathe Work

THE wear and tear on a lathe's thrust bearings can be lessened if the wood to be worked is centered on the workbench. A bolt with a thread to match the lathe spur is mounted as shown for centering.—*G. E. H.*



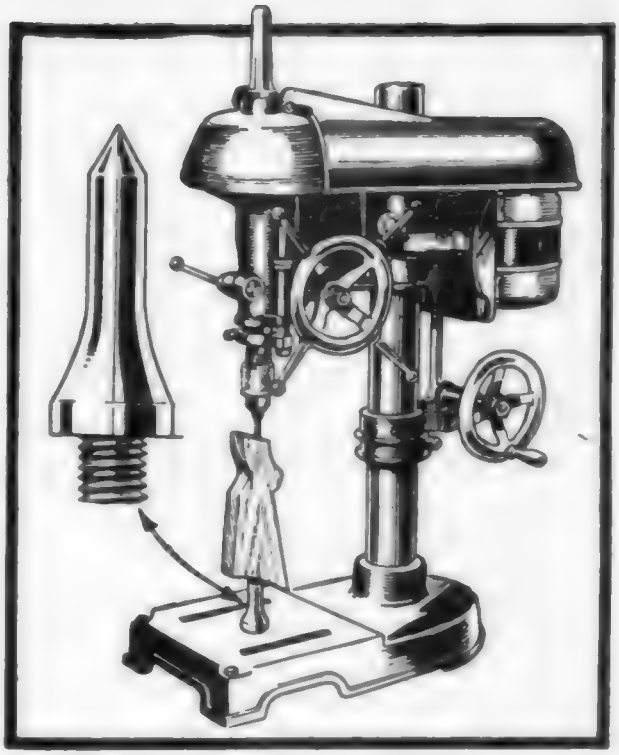

## Temporary "Easy-Pull" Nails

WHEN building temporary structures such as jigs or boat cradles, nails driven through empty 22 calibre cartridge shells are easy to remove and use again.—*A. V.*



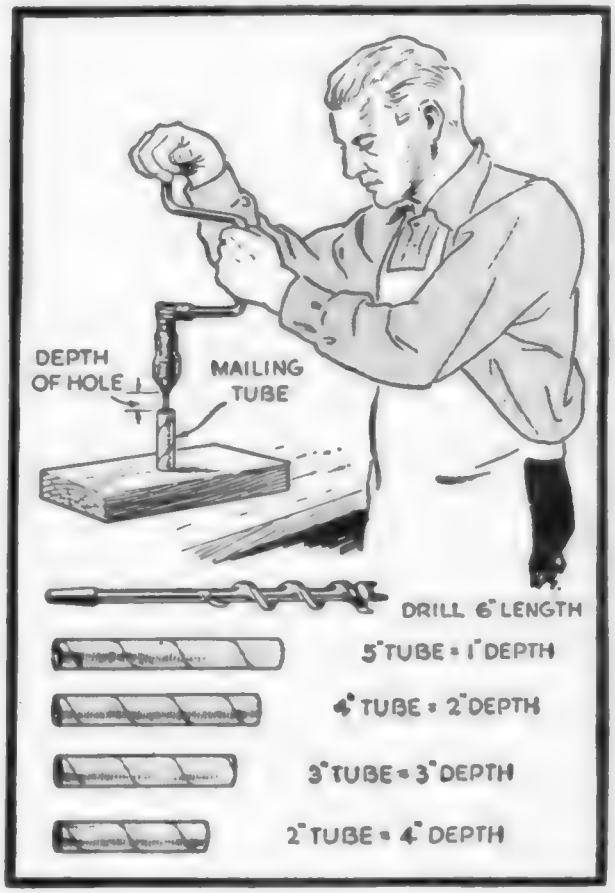

## Depth Gauges For Drills

OLD cardboard mailing tubes cut to various lengths make handy depth gauges for drilling wood. The table shown indicates the method of gauging the hole's depth.—*R. F. K.*

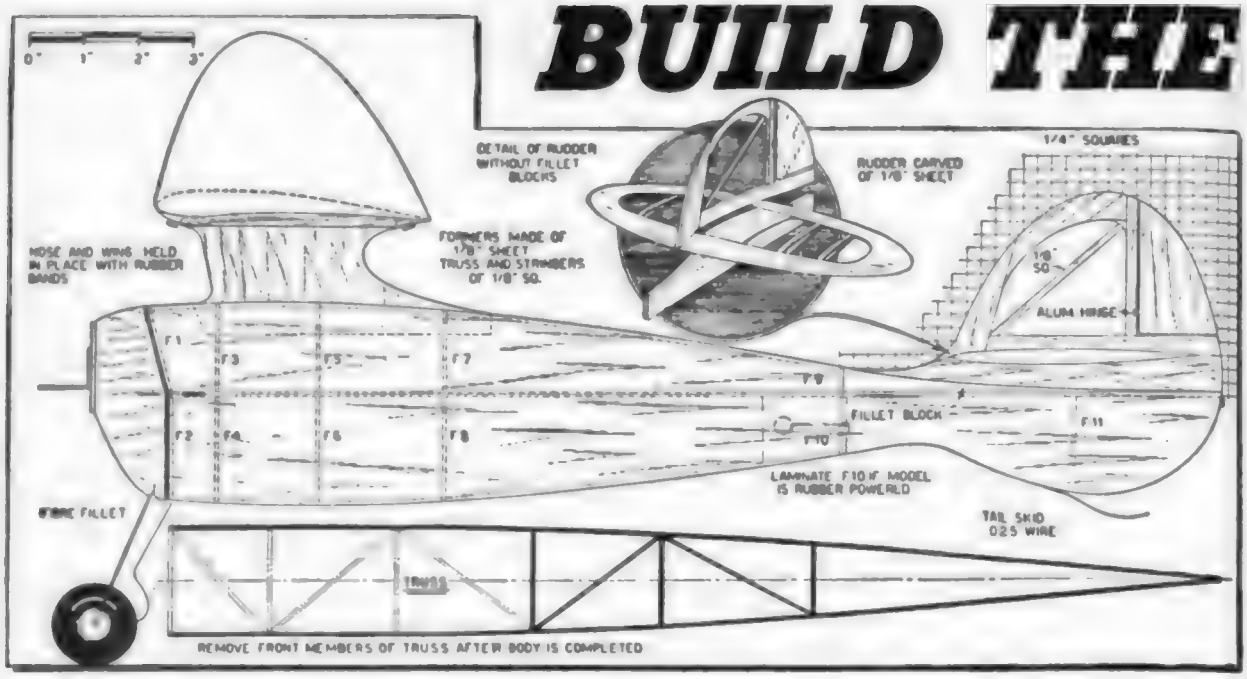


## Aiming A Long Drill

TO DRILL a long hole with an accurate entrance and point of exit, mount a lathe dead center as shown, with its point directly beneath the drill point.—*C. B.*



# BUILD THE




WITH the development of smaller and smaller gas engines, model airplane designers have perfected smaller models . . . almost of vest pocket size.

The "Pocketeer" is an excellent example of the miniature or Class "A" gas powered model. This tiny flyer however, goes a step further than the ordinary gas model. Designed to render contest performance, the model inspires confidence in the gas model fledgeling.

To introduce many of the younger modellers into powered flight, the model has been designed so that it may be built and powered with a rubber band motor as well as with the Class "A" gas engine.

For those who have yet to experience gas model thrills, the ship offers an opportunity of "having your cake and eating it" . . . that is . . . the ship may be built and flown before investing in an engine.

The simplified structure of the plane enables one to build the craft in record time. This however does not hamper the performance nor the appearance of the completed model.

As the same construction instructions apply to both the gas and the rubber powered models, additional or specific information is given only wherever necessary.

### Fuselage

First plot the full size bulkheads or formers from the reduced half sections shown in the diagrams. The pattern for each former is made of cardboard and then used to fabricate the actual member from ⅛-in. sheet balsa.

Referring to the diagrams, the sheet balsa body covering patterns are fashioned of cardboard and used to fashion the final units of 1/16-in. sheet balsa. When cut, the sheets are finished off with sandpaper to remove saw marks from the surfaces and to give the parts the desired outline shape.

Before the fuselage can be assembled, it is necessary to build the truss of ⅛-in. sq. balsa strips. This is indicated in the plan of the side view drawing.

Plot the truss outline on a piece of paper and lay the strip balsa along the outline using pins to hold the strips in place. The pins must be placed on the outer and inner side of the frame and under no condition be run through the balsa. The vertical members are added to the frame and the structure is allowed sufficient time to dry.

Meanwhile, wet the sheet balsa covering patterns on the outer side. This curves the sheet so that little difficulty is experienced in forming it around the fuselage bulkheads.

The bulkheads of the upper or lower portion of the body are cemented to the truss. When dry, cement the upper or lower covering patterns to the finished assembly. Pins may be used to hold the covering in place until the glue has hardened. When complete, assemble the other half of the fuselage in the same manner. Note that the upper and lower portions of the fuselage are cemented to the truss first and then to the stringer on the top and bottom of the fuselage.

# "POCKETEER" by Nick Limber and Alan Orthof

## A 2 IN 1 MINIATURE MODEL PLANE

When carving the fuselage formers "F 10" may or may not be hollowed as indicated in reference lines on the former layout. If the model is to be powered by rubber, a laminated former is advised with the rubber hook cemented to it. A small hole is made at the side of the fuselage so that the hook is accessable.

When the fuselage is complete, the forward cross members of the truss are taken out so that the ignition and timer system fit into the hull. Also line the front former with felt.

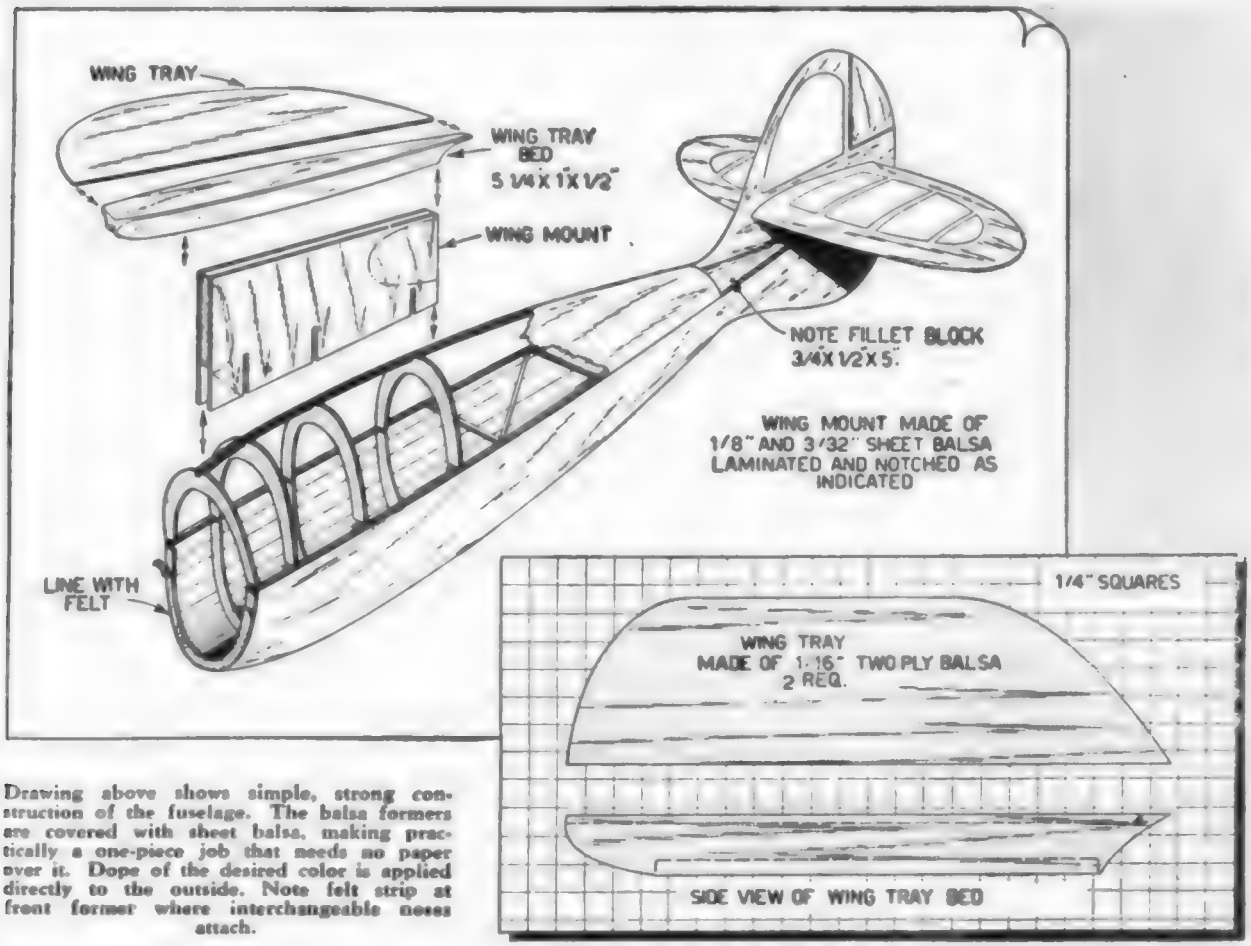
Apply several coats of dope to the fuselage and allow to dry.

### Construction of Wing

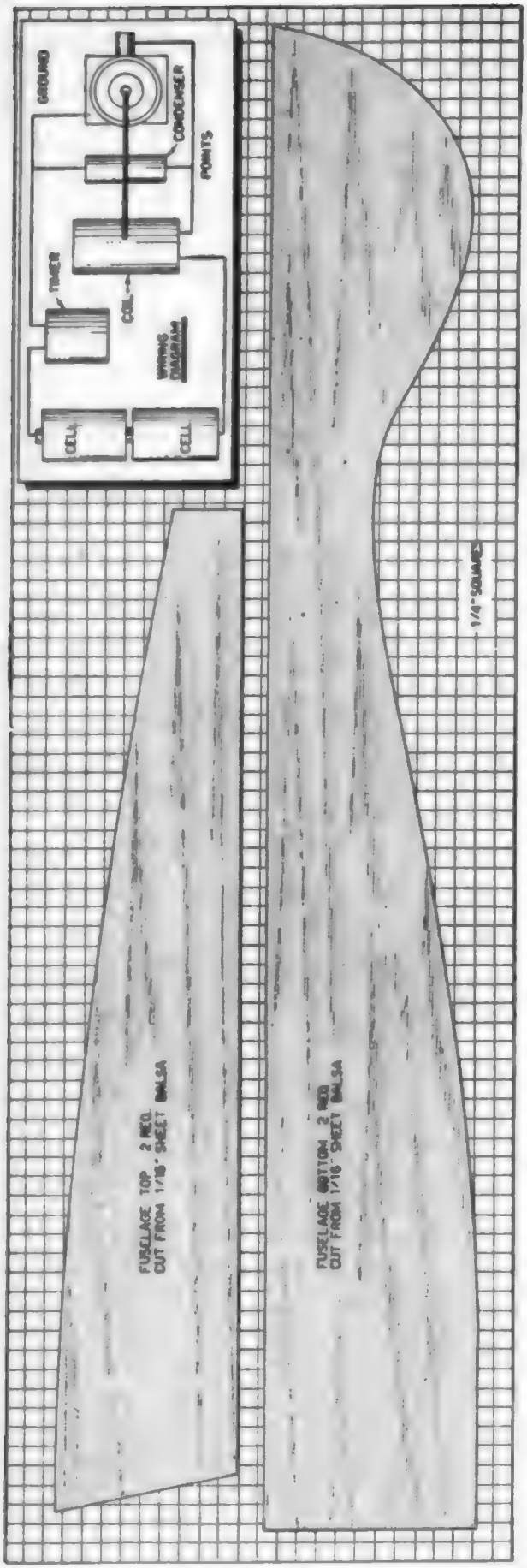
To construct the wing, first trace the rib sections to a $\frac{1}{32}$-in. sheet of balsa. Notch as indicated in the graphed portion of the plans and sandpaper each rib carefully. Trace and cut the trailing edge and wing tip from a sheet of $\frac{1}{8}$-in. sheet balsa and finish off with sandpaper. Note that this is notched to admit rear portion of each rib. When complete, cement the ribs to the trailing edge as indicated and insert wing spar into place. The latter is built of $\frac{1}{4}$x$\frac{1}{8}$-in. balsa strips tapering to $\frac{1}{8}$-in. square at the tip.

The leading edge formed of $\frac{1}{8}$-in. square balsa is cemented to the ribs and the forward portion of the upper wing surface covered with $\frac{1}{32}$-in. sheet balsa. Cap strip each rib with $\frac{1}{32}$-in. sheet. Both the upper and lower surfaces are cap stripped.

To form the proper dihedral angle, the base rib is slanted slightly as indicated in the drawings. A 3½-in. dihedral is placed at each tip. Place books under the tips until the cement has hardened sufficiently to hold the wing panels together without loosing the correct dihedral angle. Cover the wing with tissue and dope to insure drum-like tautness.




Drawing above shows simple, strong construction of the fuselage. The balsa formers are covered with sheet balsa, making practically a one-piece job that needs no paper over it. Dope of the desired color is applied directly to the outside. Note felt strip at front former where interchangeable noses attach.




Lay out fuselage sides and top following pattern above and cut from sheet balsa.

## Tail Assembly

The elevators are built of ⅛-in. sheet and consist of ribs cap stripped with $\frac{1}{32}$-in. sheet. First trace the outline onto the ⅛-in. stock and cut out with the aid of a sharp knife or razor. Sandpaper to shape indicated. Note that the leading and trailing edges of the unit are cemented together before the ribs are fastened into position.

The ribs for the stabilizer are made in much the same manner as those for the wing. Cap strip both the lower and upper surfaces and cover the leading edge of the upper surface with $\frac{1}{32}$-in. sheet.

The rudder is carved of ⅛-in. sheet and assembled as indicated in the perspective drawings. Cement the elevators to the rudder assembly before the bottom part of the rudder is glued into position and the soft balsa fillet blocks shaped.

The latter assume the shape of the upper part of the fuselage and are cemented directly to the rudder. To prevent the assembly from shifting, a triangular plate is cemented to the bottom of the unit. This fits snugly into the rear portion of the truss. The tail assembly is fastened to the fuselage with rubber bands.

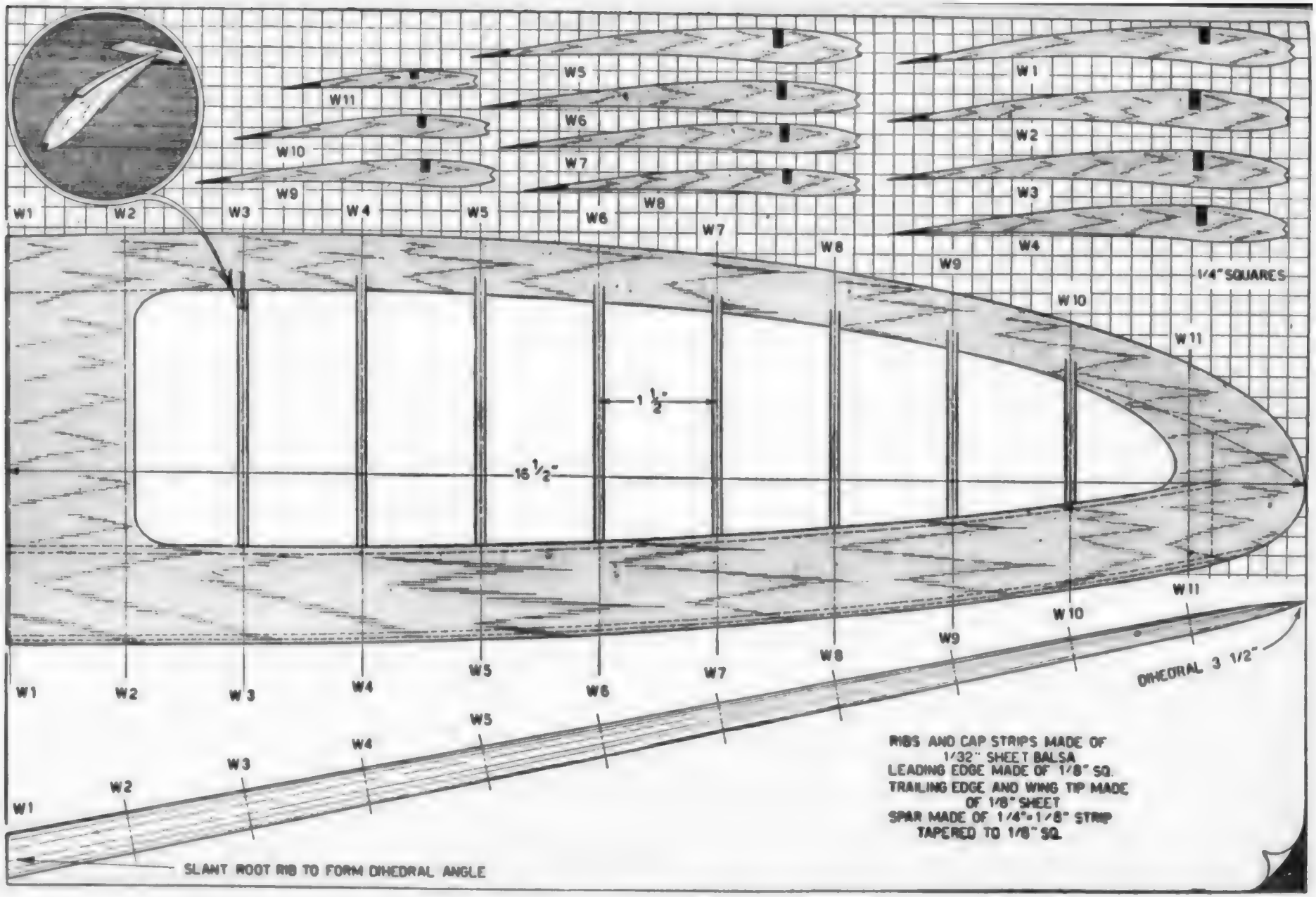
## Nose Block Detail

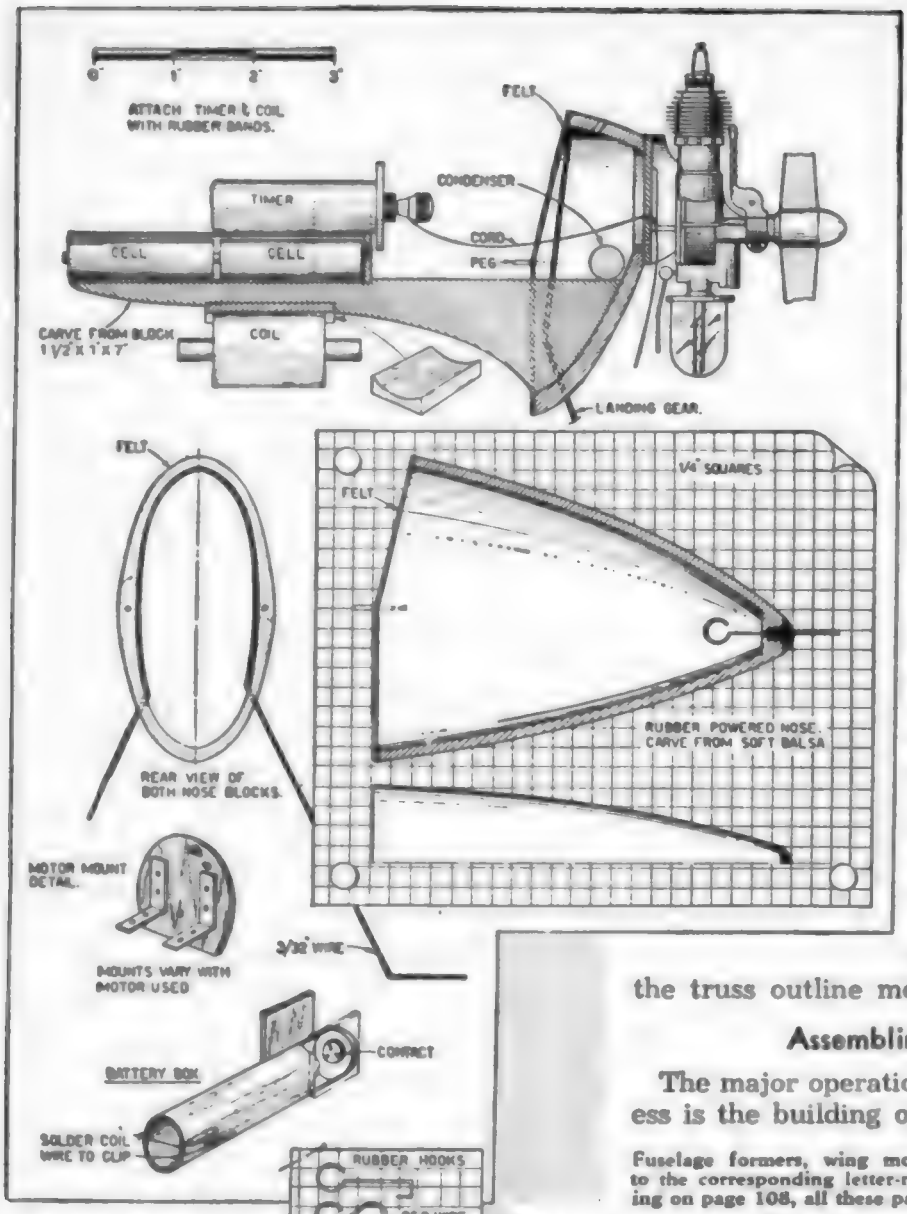
The nose block for the rubber powered version, as indicated in the diagrams, is quite simple to construct. Fabricated of two soft balsa blocks 1-in.x4-in.x5½-in. shaped as shown and hollowed out. A ready made nose plug and hard wood 12-in. propellor are attached to the unit in the orthodox manner.

The nose block for the gas powered model is slightly more complex in that the ignition system and timer are mounted to the unit.

To build the unit first carve the nose piece from hard balsa blocks each measuring 1-in.x2-in.x4-in. Shape as shown and cement in position a fire wall fabricated of ⅛-in. three ply. Holes for the bolts holding the motor mounts in place, and for the timer string are drilled before cementing the fire wall to the block. The motor mounts are of angle aluminum and needless to say will vary with each engine used.

The backbone of the ignition system structure is a balsa block 1½-in.x1-in.x7-in. Shaped as indicated this is cemented to the rear of the nose block. A battery box is fashioned of $\frac{1}{32}$-in. sheet balsa shaped in the form of a tube. This is cemented to the backbone or ignition block.


W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
1/4" SQUARES
1 1/2"
16 1/2"
DIHEDRAL 3 1/2"
RIBS AND CAP STRIPS MADE OF 1/32" SHEET BALSA
LEADING EDGE MADE OF 1/8" SQ.
TRAILING EDGE AND WING TIP MADE OF 1/8" SHEET
SPAR MADE OF 1/4"-1/8" STRIP TAPERED TO 1/8" SQ.
SLANT ROOT RIB TO FORM DIHEDRAL ANGLE




Gas powered nose has timer, batteries, condenser, etc., all attached as a single unit which slides into place. Rubber powered front is shown in squares. Each nose has its own landing gear, though one set of wheels may be used on both.

The condenser is mounted inside the nose block. The coil is suspended below the block as indicated in the cross section of the assembly. Two $\frac{1}{16}$-in. sheet balsa plates are cemented to the sides of the battery box in order to prevent the timer from slipping. The latter, as shown, is placed above the battery box. Rubber bands hold the timer and the coil in place.

The landing gear of the plane is made of wire bent around the inside of the nose block. Liberal cement and plastic wood will prevent it from coming loose after being attached to the block.

Landing gear for the rubber power nose is constructed or assembled in much the same manner as was that for the gas model. The only difference is in the length and thickness of the wire used.

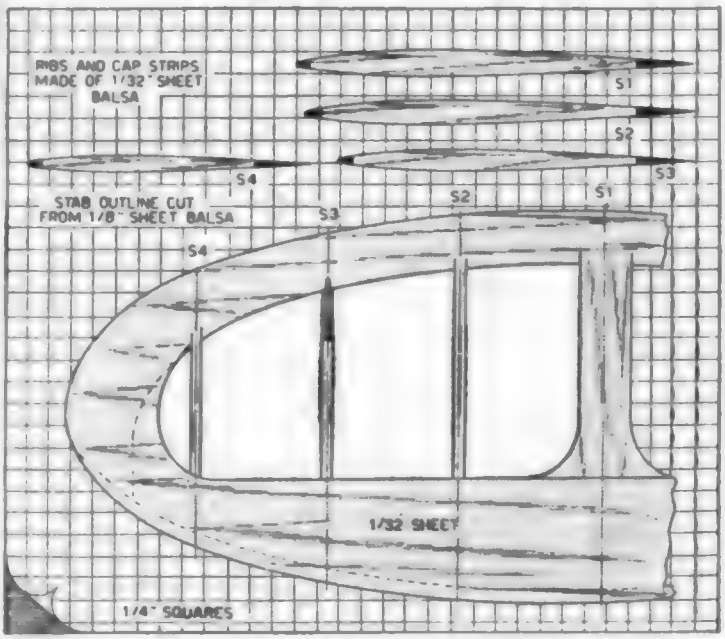
For the rubber powered version of the "Pocketeer" $\frac{1}{16}$-in. diameter wire is used. The length of the gear is 7-in. Wheels for both ships may be the same.

After the landing gears have been assembled, the nose blocks are lined with felt, as was the front former. Dowel pegs are inserted into the blocks. These fit into holes made in the front former and the truss outline member.

## Assembling the Model

The major operation in the assembly process is the building of the wing mount. The

Fuselage formers, wing mount, firewall, etc. By referring to the corresponding letter-number designations in the drawing on page 108, all these parts may be identified and located.

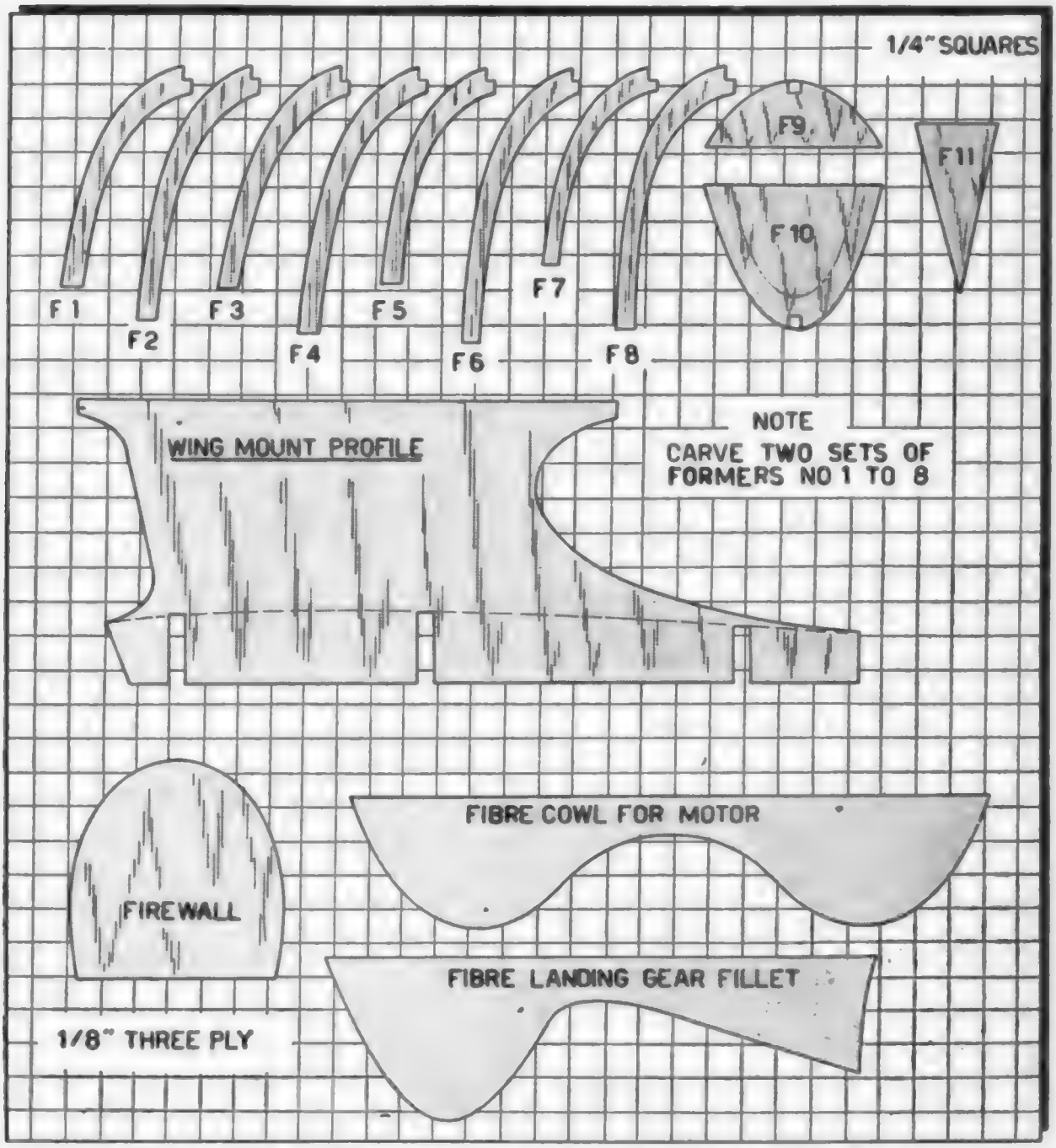


mount is constructed of ⅛-in. and $\frac{3}{32}$-in. sheet balsa laminated, shaped and notched as shown in the perspective.

A hard balsa block 5¼-in.x1-in.x½-in. is used to form the wing tray bed. Shaped as shown, this is cemented to the top of the wing mount. To insure a tight fit, notch the bed so that the mount fits snugly into place.

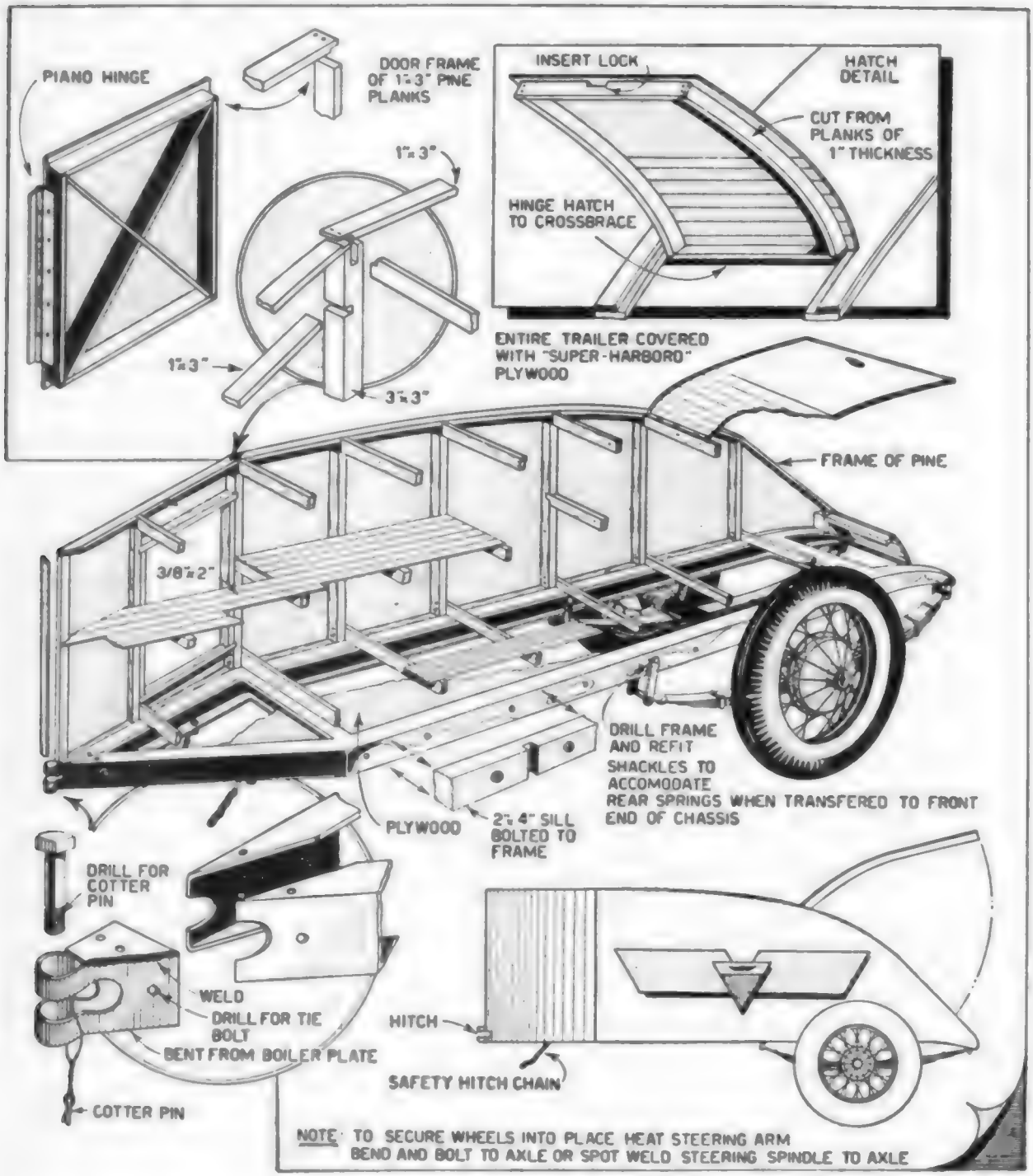
Sheet balsa of $\frac{1}{16}$-in. thickness is used to form the wing tray. Make two sides of the tray and cement these to the top of the wing bed. The mount is now ready to be assembled to the fuselage. Cut away a strip of the covering in the portion of the fuselage into which the mount is to fit. Insert mount, cementing it to the upper stringer and formers 3, 5, and 7. A liberal amount of cement and plastic wood will insure a strong joint. The mount is sandpapered to form a streamlined section prior to attaching it to the fuselage structure.

Five assembly hooks are bent of .025 wire as shown in the plans, and used to hold the wing, the nose block and the tail assembly in place. Using the hooks and the rubber bands, the craft may be disassembled for transporting with safety. [*Continued on page* 155]




Tail assembly and ribs. These are capped with sheet balsa in the same manner as in the wing.

# A Model Airplane Trailer

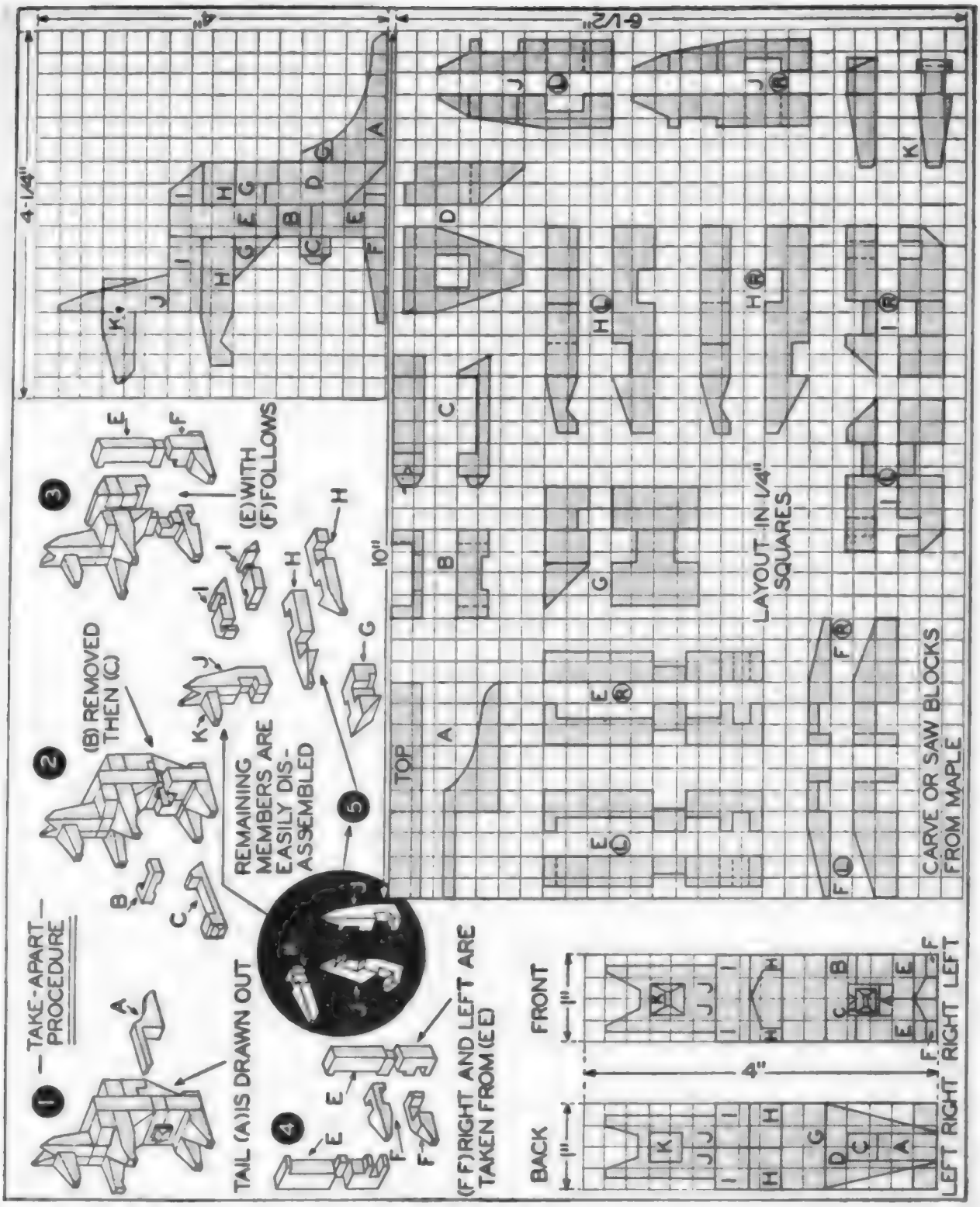



THE model airplane builder who takes his planes to contests frequently must find some means of transportation that will not cause damage to the machines. A great many model enthusiasts have solved the problem by the use of a specially made trailer.

A trailer for the purpose of carrying model airplanes can be built at a considerably lower figure than those commonly used for camping or traveling. Any old automobile frame from a light or medium weight car will make an excellent chassis. The accompanying drawing shows the general design.

The body of the trailer need not be any wider than the frame. This type of construction eliminates a great amount of difficulty usually encountered in providing wheel clear-

[*Continued on page* 154]

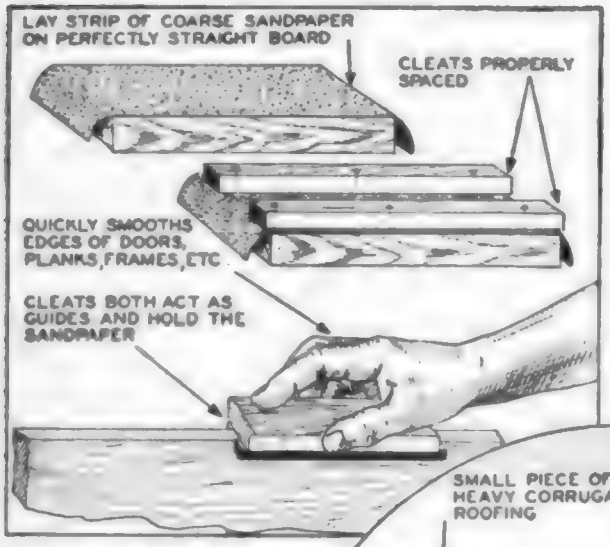



## Kangaroo Puzzle

THIS unique puzzle offers a good opportunity for the craftsman to try his hand at fitting joints neatly. There are 16 pieces, with right-angle cuts where they interlock. Widths are confined to $\frac{1}{4}$", $\frac{3}{8}$", and $\frac{1}{2}$", on the outside. Dimensions are given in the squared profiles. A hardwood, such as maple, is recommended, but if made with a jackknife, soft white pine will of course be much easier to work. Take it for granted that quite a lot of fitting will be necessary. A good plan is to complete one piece, such as the tail "A," and fit the others to it as you proceed. The completed article resembles a real kangaroo.

# LABOR SAVING IDEAS

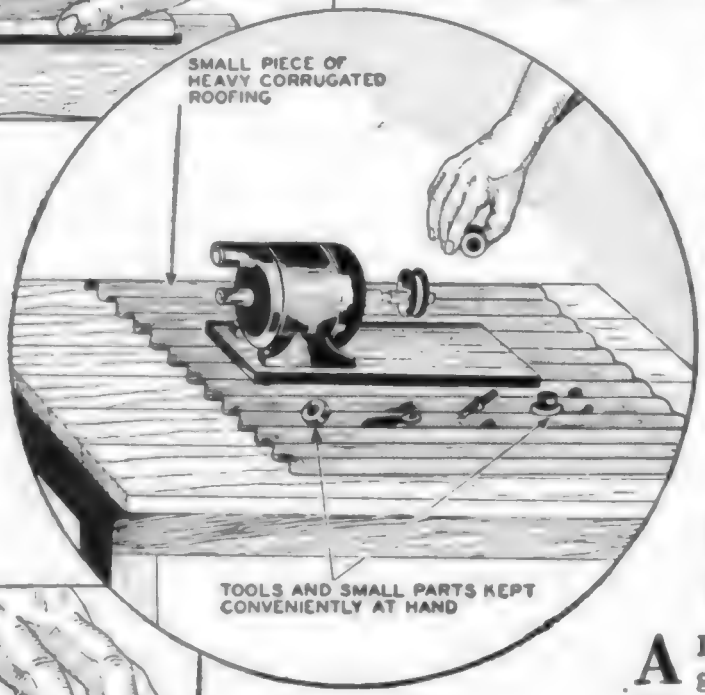
## An Effective Substitute For A Plane




ALMOST every house seems to have at least one door that sticks when it is shut. Frequently, when trimming to fit, the amateur carpenter is apt to take off a little too much with a plane. In other cases, when a plane is not available, the door is never fixed. Sandpaper mounted on a "guide block" as shown does an excellent job.—*A. H. W.*

## Prevents Loss Of Small Parts

WHEN assembling small machines the parts frequently are lost through rolling away. A simple way to prevent this loss is the use of a piece of corrugated sheet metal as shown. Parts may then be placed in the corrugations as shown, where they will remain.—*A. H. W.*

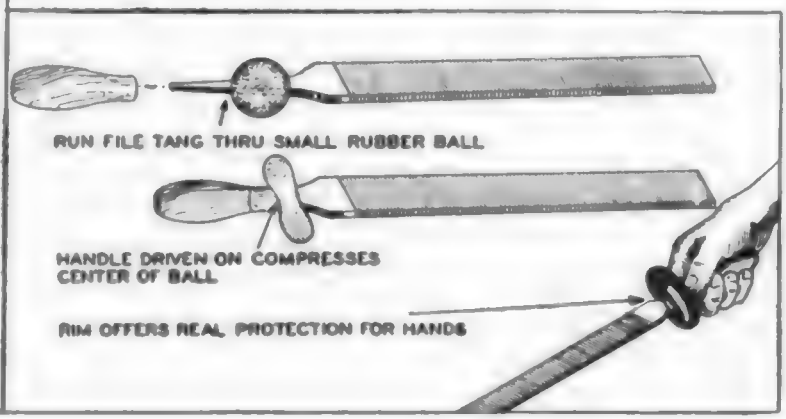



## Tire Tube Cans

FIVE or ten pound grease cans make good storage containers for inner tubes. Cans must be absolutely clean for use.—*A. H. W.*

## Rubber File Guard

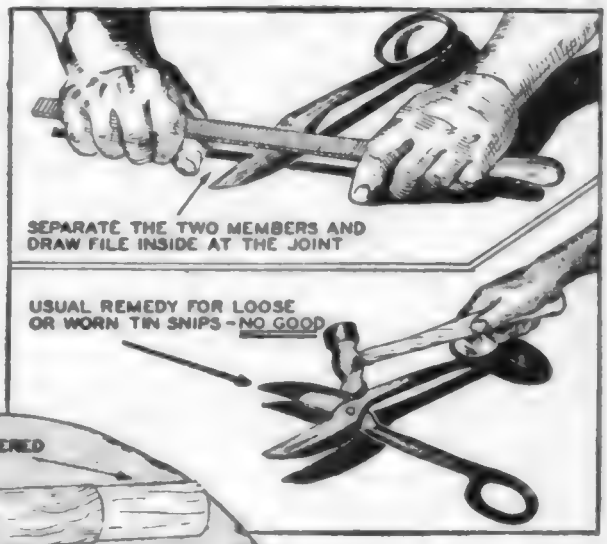
A DURABLE finger guard for workshop files can be made as shown from an old rubber ball. The handle of the file is removed, and the ball forced on to the file prong. Then the handle is replaced.—*A. H. W.*



# FOR THE WORKSHOP

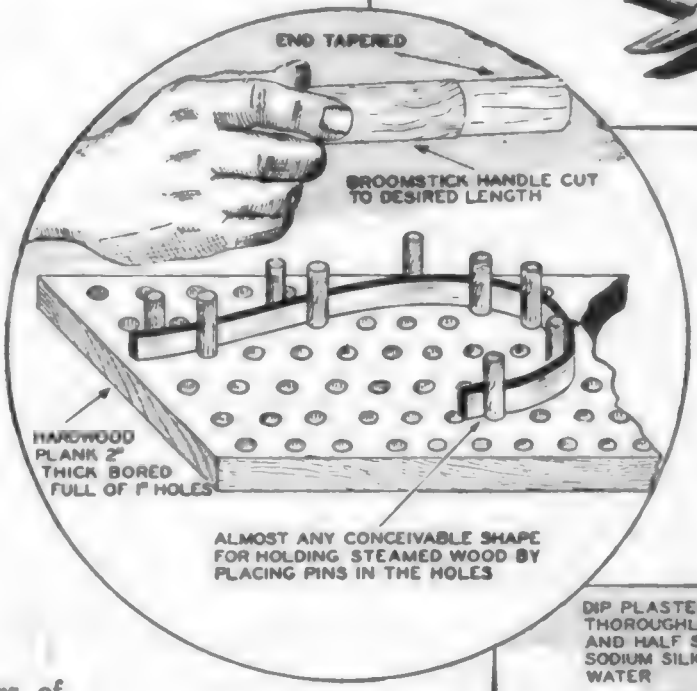
## How To Prevent Jammings Of Tin Shears

WHEN tin shears show a tendency to twist the metal being cut, and jam, the remedy is not found by pounding the pivot bolt with a hammer. On the contrary, the bolt should be removed by unscrewing the nut, and separating the blades of the shears. Then the metal immediately adjacent to the hole should be carefully filed down so that the blades will contact each other. The "jamming" is caused by the fact that the blades wear faster than the non-cutting surfaces around the pivot. This latter metal must be filed down —*A. H. W.*




## Form For Steaming

WHEN considerable steam bending is contemplated, it is a good idea to have a forming plank. This is an ordinary board with holes bored in it to take short pegs made from broom handles.—*A. H. W.*

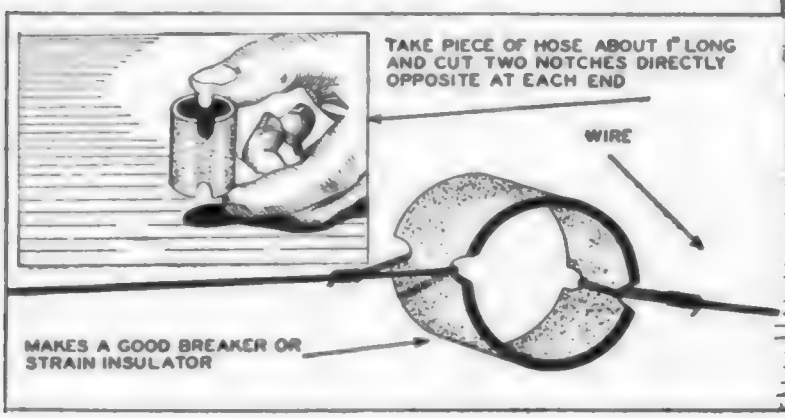


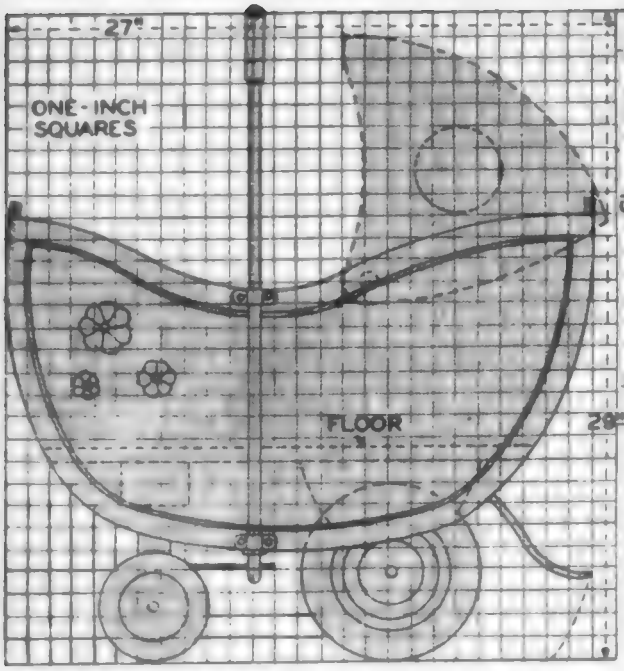

## Stronger Plaster

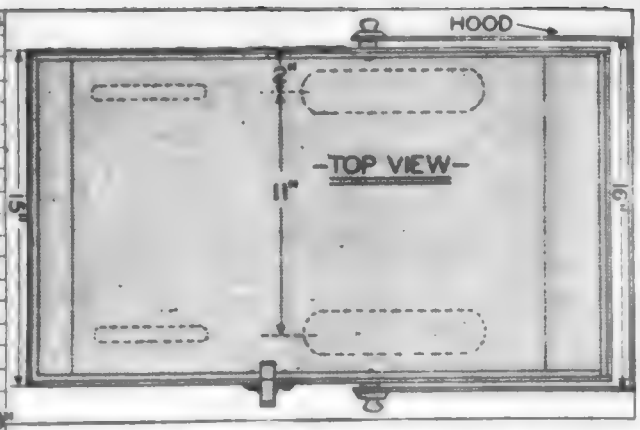
SMALL plaster statues or castings can be strengthened by dipping in a solution of half water and half sodium silicate.—*A. H. W.*

## Aerial Insulator

STRAIN insulators of the type used on radio aerials are easily made from a short length of garden hose, cut as shown. The woven cord in the hose adds strength without reducing insulating qualities.—*A. H. W.*






# Side Steering BABY BUGGY

by Hi Sibley

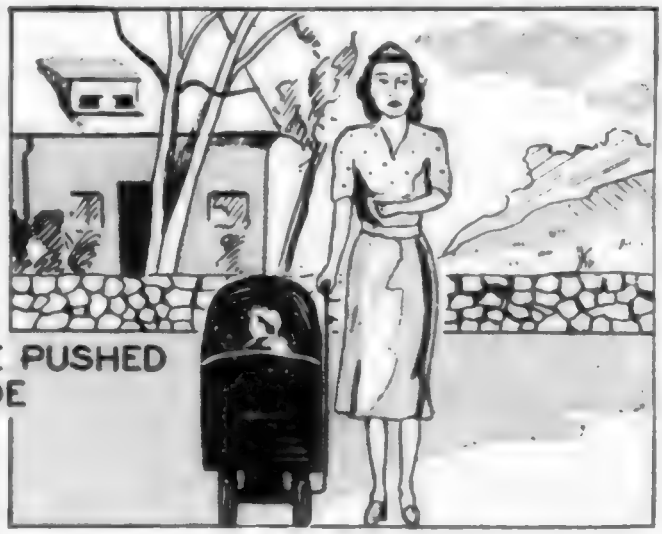
Lay out the above pattern on wrapping paper, then cut from waterproof plywood. When placing the windows in the hood smear white lead around the frames to make them rain-proof.

WHEN better baby carriages are built, you yourself can do the building. An expectant father can occupy his spare time in no more worthy pursuit than the construction of a jaloppy for Junior, so the young chip may ride in style after his (or her) arrival. Baby carriages are usually a rather expensive item, but by following these plans you can have the very latest style buggy at a fraction of the store cost.

This up-to-the-minute chariot keeps the infant in constant view of the attendant, even when the hood is up, and requires less room than the conventional design. The combined pushing and steering handle is conveniently at the side, the natural position as in leading a child. An exceptionally short wheelbase makes for easy maneuvering in restricted spaces, and the carriage can be literally turned on a dime. A foot bracket at the rear prevents tipping over backward and also serves as a lever to lift the buggy over curbs, as illustrated in the operation sketches below.

Principle dimensions are given in the squared profile drawing above. The sides are cut from ⅜-in. waterproof plywood (Super-Harbord), and ⅛-in. material is used for the curved ends. If greater weight and strength is desired, the sides may be made from ½-in. and the ends from ¼-in. plywood. Moldings

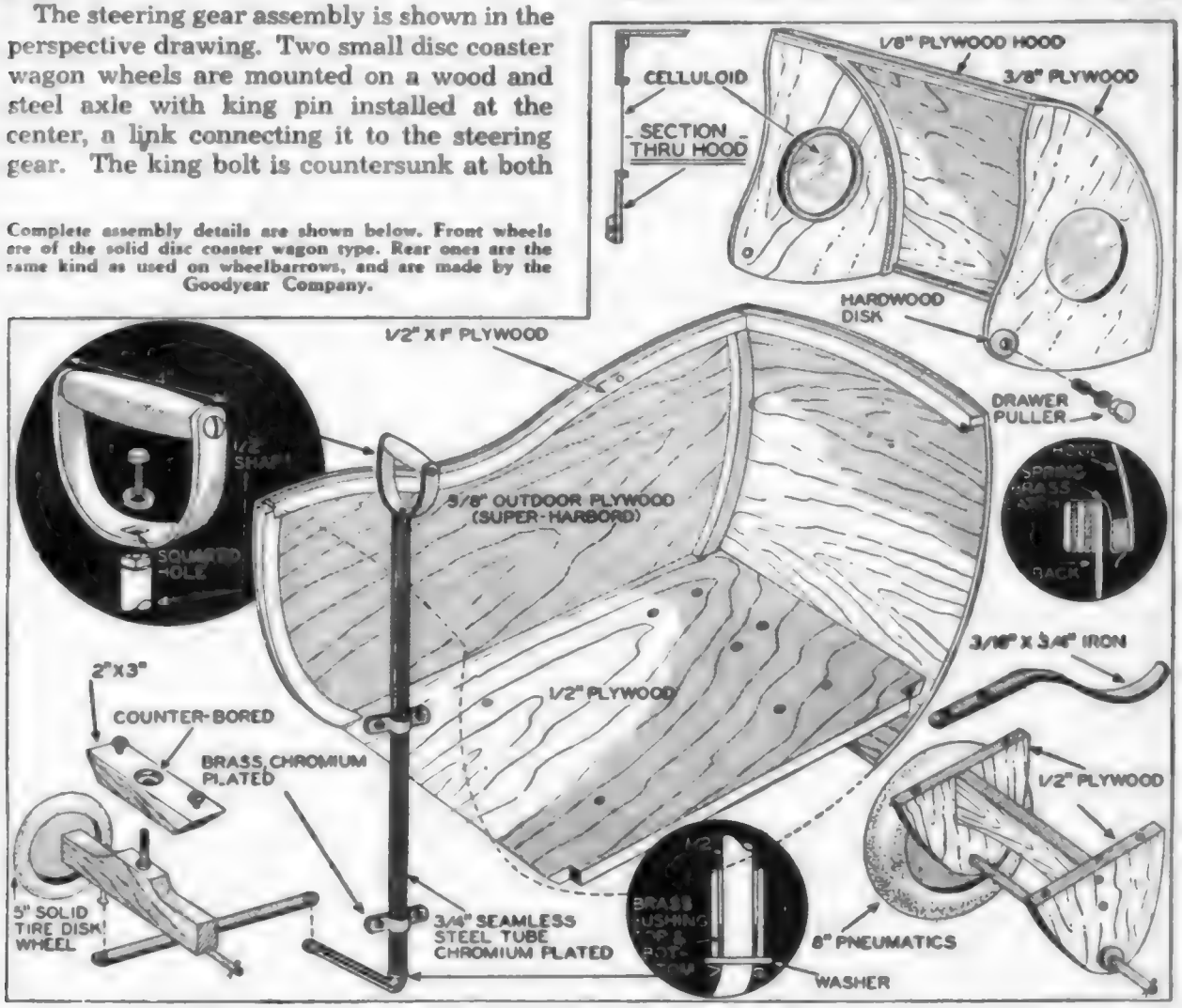
## HOW NOVEL BABY CARRIAGE IS OPERATED



and battens are scroll sawed from ½-in. plywood and assembled with brads and casein glue. The sides are joined by the bottom and cross members at top of dash and back. Make the hood of the same material as the body. A brass latch will hold the top up when necessary.

The steering gear assembly is shown in the perspective drawing. Two small disc coaster wagon wheels are mounted on a wood and steel axle with king pin installed at the center, a link connecting it to the steering gear. The king bolt is countersunk at both ends, in the wood of upper and lower member. The steel axle sits in a groove in the lower piece and is secured with large staples or U-bolts.

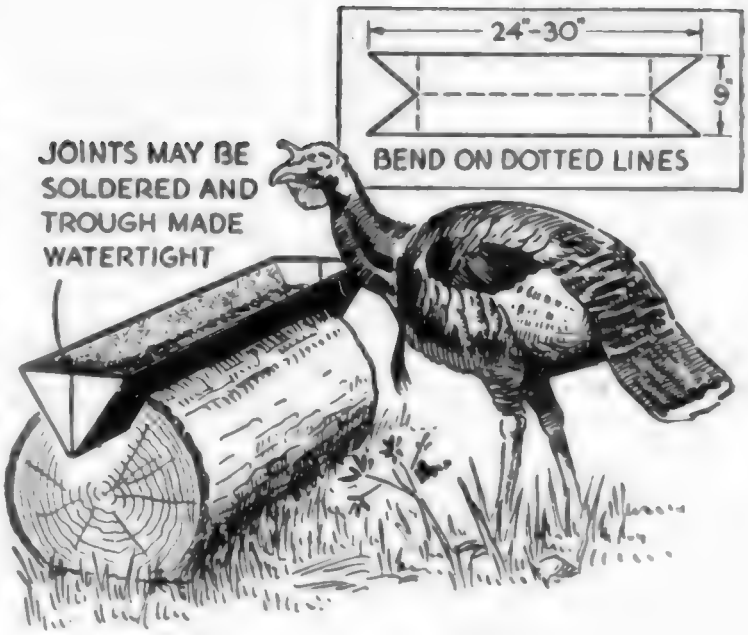
The brass parts can be chromium plated at small cost, and will make a striking effect against a dark blue body with white striping.

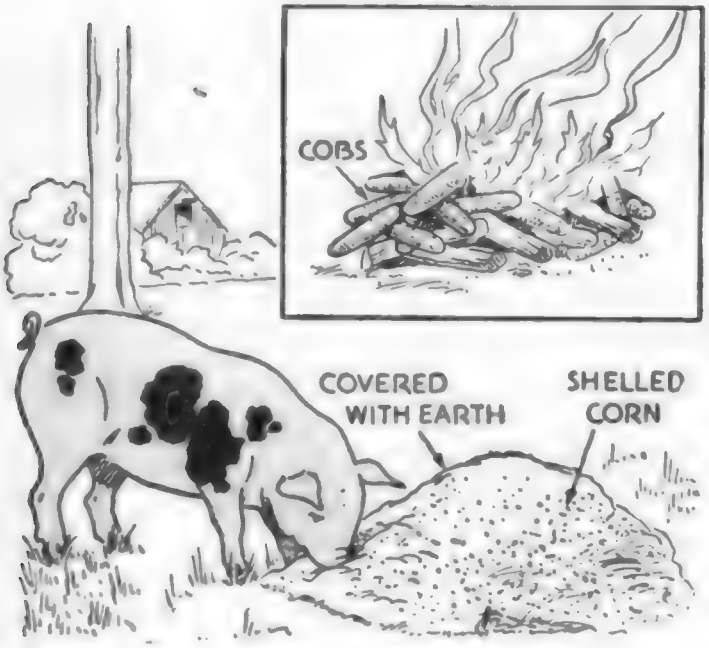



Complete assembly details are shown below. Front wheels are of the solid disc coaster wagon type. Rear ones are the same kind as used on wheelbarrows, and are made by the Goodyear Company.

## Stub Logs Make Turkey Troughs

CHUNKS of firewood and panels of galvanized iron make excellent mash and dry feed troughs for the turkeys. The chunks are split off flat on the under side so they will not roll, then a V is sawed in the top of each. The galvanized iron is bent to form a V trough. This is tacked into the groove in the wood, then the ends are bent inward as shown to close them. Thus the troughs are well above the ground, and cost but little. The troughs may be soldered to make watering troughs. —*D. V. H.*

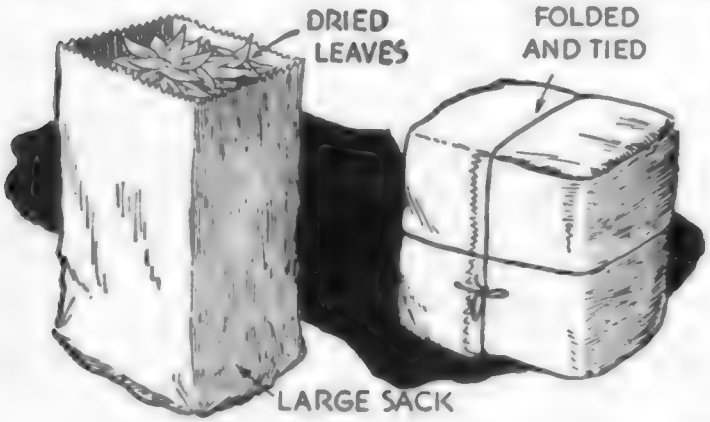



## Charcoal For Hogs

A VETERINARIAN suggested this method of providing charcoal whenever the hogs need it. Start a fire away from the buildings, heap on corn cobs or wood and let the pile burn until most of the pieces are half charred. It will be best to use small pieces of wood if any, but cobs are superior. When the fire is going well and the fuel is partly consumed, throw earth over it to smother it. Later sprinkle some shelled corn on the mound after the embers have cooled. The hogs will quickly find, root out, and eat the charcoal, which is an excellent conditioning material.—*D. V. H.*

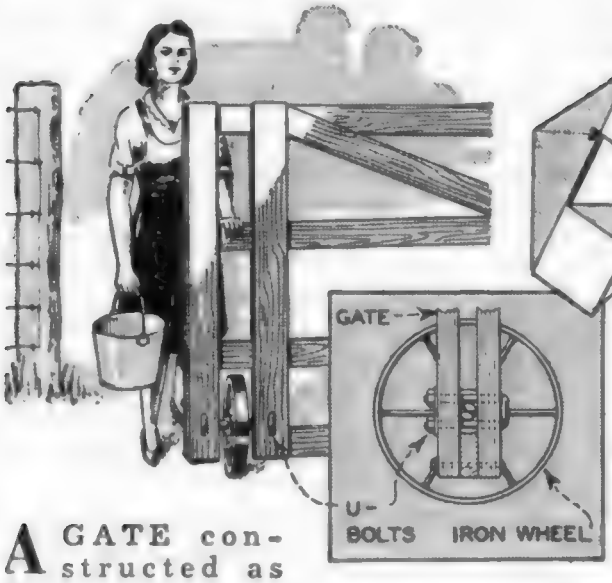
# Bags Of Leaves Make Good Kindlings




EACH fall wet down fallen leaves on the lawn with the hose, then, while they are still very damp, pack them into large kraftpaper sacks from the grocery store. The leaves are tamped down tight and, while wet, the sacks are tied with cord or a large rubber band and the units stored in the garage.

Under cover they slowly dry out and make surprisingly hot "bricks" either for fireplace use or furnace fire kindling.—*D. V. H.*

## Monowheel Gate

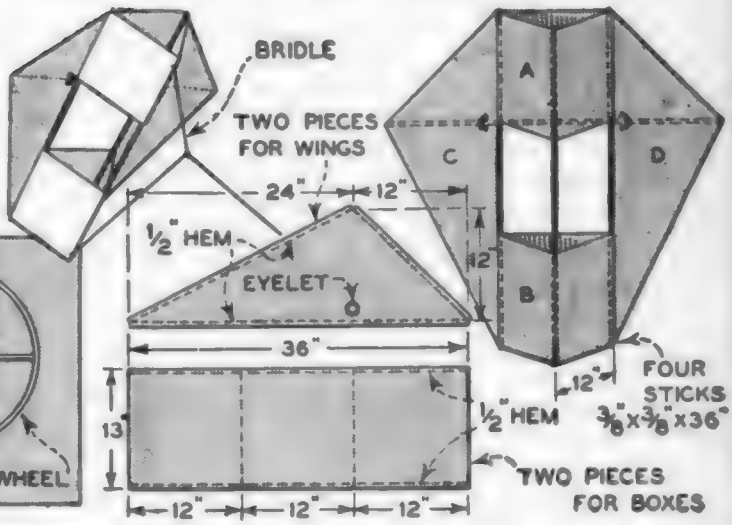



A GATE constructed as shown cannot sag. The weight is supported by a wheel which turns on a shaft. Each end of the shaft, held in place by U-bolts, is placed between two 2"x6" boards extending to top of gate.—*W. M. G.*

## Two Fishing Kinks

FOR neatness and safety, fishhooks can be kept on safety pins as shown. A good float for perch fishermen can be made from a willow twig with the severed shanks of two hooks inserted. Paint to suit.—*F. C. & R. F. K.*

## Weather Bureau Kite Flies In The Rain



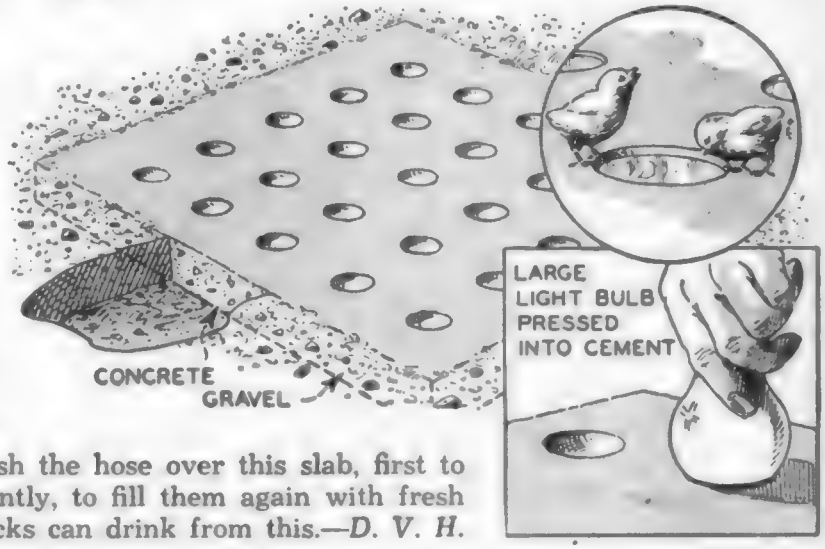

THIS is one of the steadiest flying kites that is used by many weather bureau groups. It is simple to construct and will carry loads the ordinary type would stagger under. Note that it is built or planned so any size can be built by remembering that any part is arranged in thirds. That is—the wings are three times as long as their width —the box part is three sided—etc. This particular kite is three feet high, boxes 1 ft. high and wide. Wings and boxes are of light cambric or similar cloth. These should be cut out first and stitched to conform with patterns shown. When completed, the two boxes are 36-in. long by 13-in. wide.

The two wings are triangular, long sides 36-in., short sides 24 and 12-in. Sew an eyelet in each wing at the point indicated.

[*Continued on page* 155]

## Concrete Drinking Cups For Chicks

THE slab shown sets nearly flush with the ground and the space around it is well graveled. Immediately after the concrete has been poured, use a 100-watt bulb at 12-in. intervals to indent the concrete surface. Make depressions about 1-in. deep.



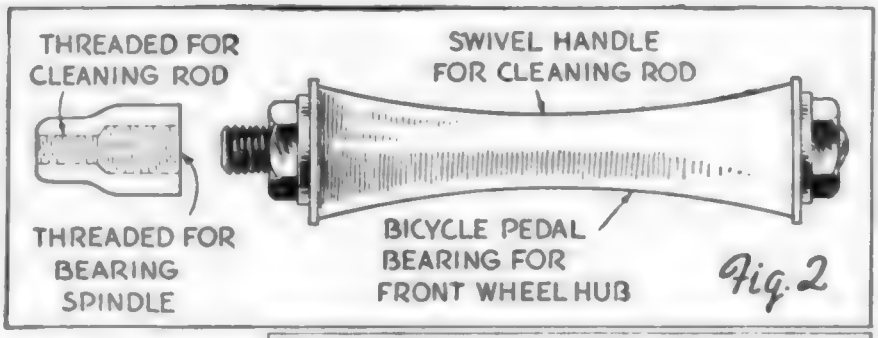

Each morning and noon, flush the hose over this slab, first to wash out the pockets, then gently, to fill them again with fresh water. Nearly 1,000 small chicks can drink from this.—*D. V. H.*

# How to

**Given proper care, a sporting gun will last for many years. Some owners of firearms who believe they are taking all the necessary precautions against the ravages of rust and corrosion, suddenly find hidden deterioration. Here is reason and remedy.**

Above: The centering pin is especially useful in cleaning the bolt action guns, where the patch must be reached over some length.

Right: Bicycle front hubs and pedal bearings make good handles for cleaning rods. Threads on coupling hold handle to rod.



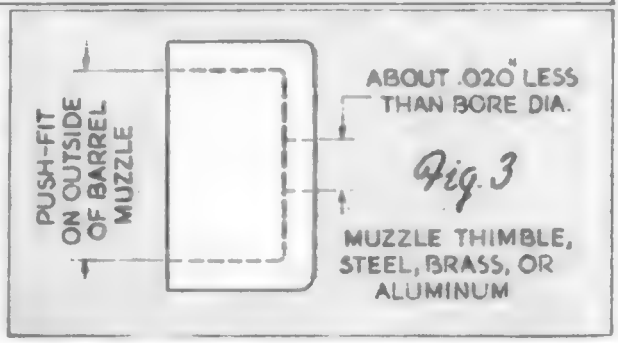

by
Clyde Baker

VERY few rifle, shotgun or pistol barrels are ever worn out, or shot out, from use; a big percentage of them are *rusted* out from sheer neglect through ignorance or misunderstanding.

Modern ammunition is mostly of the so-called "rustless" or "stainless" variety, in that the primer composition does not contain potassium chlorate, which, in combustion, changes to potassium chloride—a near relative of common salt. And SALT, in contact with metal, absorbs moisture, and causes RUST. This fault, as before stated, is largely eliminated from modern ammunition, but just the same, the shooter of intelligence, who appreciates a fine rifled tube, whether it's on a six dollar single shot twenty-two, or a two hundred dollar custom-built "sporter" is going to have a much clearer conscience if he gives the bore a little attention reasonably soon after shooting; for it's a complex assortment of chemical reactions which take place in a gun barrel at the instant of firing . . . and it does no harm to play safe.

With the old type ammunition, plain boiling hot water was the best of all powder solvents, and it's still an excellent stand-by.

Set the muzzle in a pan and pump the water back and forth a few minutes, with a snugly fitting swab on the end of a cleaning rod. *Never* under any circumstances use a slotted tip rod, as the patch will likely double up and

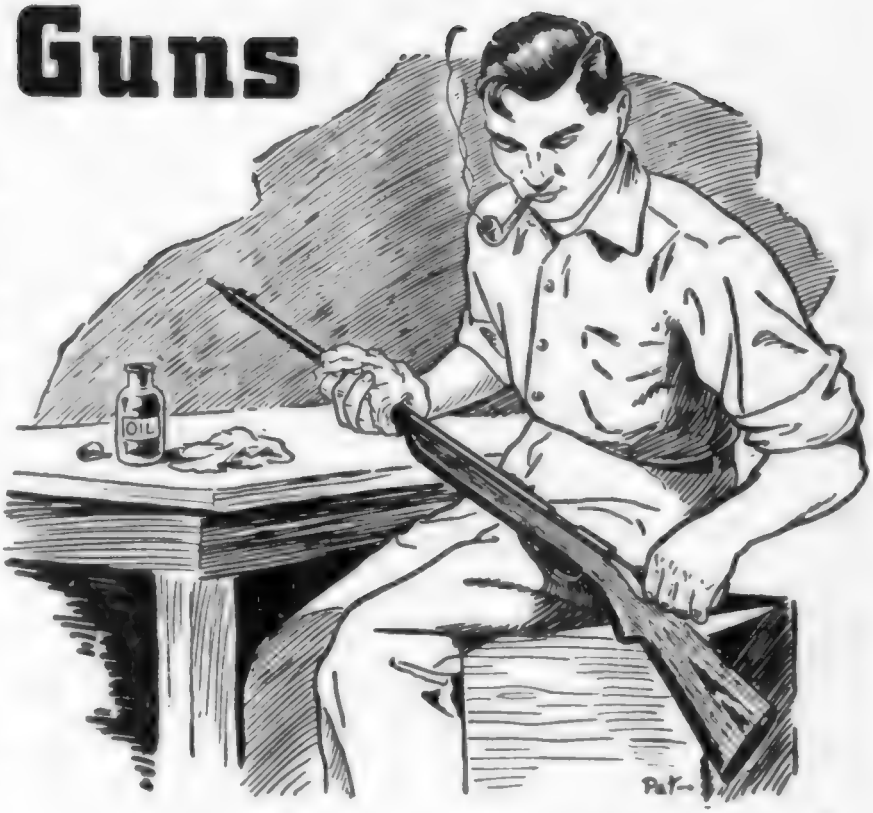



Above: When a gun must be cleaned through the muzzle, a thimble, or cap should be fitted snugly over the muzzle. A hole drilled in it allows the cleaning rod to slide.

jam the whole thing immovably in the barrel. Use a "jag" tip like Fig. 1, made of steel drill rod—not brass. .185" is the right size for a .22 caliber, and also for any of the .25 calibers. For a .270 caliber, make the rod about .225" diameter, and for .30 to .35 caliber, make it of .275" stock. Steel drill rod, understand—not brass or copper. Some of the cleaning solvents will attack the softer metals, and give greenish or bluish colors, so that you can't tell whether you're taking out metal fouling, or merely eating up your pet cleaning rod!

Make your cleaning patches of heavy canton flannel—fuzzy on one side, twilled on the other; get a yard or two, soak and dry it several times to make it more absorbent. Cut it into two-inch squares for .50 caliber; one and one-eight-inch squares for .22 caliber. Experiment for other sizes, in between and over.

# Clean Guns




When not in use, guns should be given a protective oiling.

Good steel rods are not hard to make. The only dimension requiring accuracy is the diameter—of tip and that comes as you buy it. If a lathe is not available for turning the tip—t. ` it. A centering pin, as shown in Fig. 1 is a worth-while convenience, but you can do without it if you must. It is particularly useful on bolt actions, where you must reach your patch through a long receiver.

Drill rod a little larger than specified is all right *so long as it will slip through the bore.* Turn or file down the tip portion to about the size specified — just so the patch will fit snugly and slide back and forth in bore without sticking or buckling.

Jointed rods are an abomination. The ones you make, or the best "boughten" ones, will buckle slightly (sooner or later) and rub against the bore, in spite of everything. There are no conditions, on a one day excursion, a two weeks' camping trip, or a two-year safari, that would prevent taking along a good, substantial one-piece cleaning rod. It weighs less than a pound, and certainly would never be any longer than the rifle—and you do take that!

A swivel handle is mighty convenient, easily and cheaply made from a 35c bicycle pedal or front hub. Twist off the pedal parts leaving only the ball-bearing hub and spindle. Turn and thread a coupling as shown in Fig. 2, one end to fit the rod, the other to fit the hub spindle. Sweat or pin it so it can't slip loose on the threads—or rust it by moistening threads and rubbing with salammoniac, and turn in very tightly. Cover the hub with cork or tape, to give a firm, comfortable grip.

Always clean from the breech if construction of the arm permits, to avoid muzzle friction which may wear the muzzle slightly "belled." A very little wear here spells INACCURACY—in big letters. If necessary to clean from the muzzle, turn up a thimble or muzzle protector as shown in Fig. 3. Inside diameter should be a snug push-fit on the barrel; hole diameter, an easy "slip-fit" for the cleaning rod.

Cleaning solvents: One of the most famous cleaners ever produced—which has retained its popularity despite the coming of "non-fouling" ammunition—is made as follows:

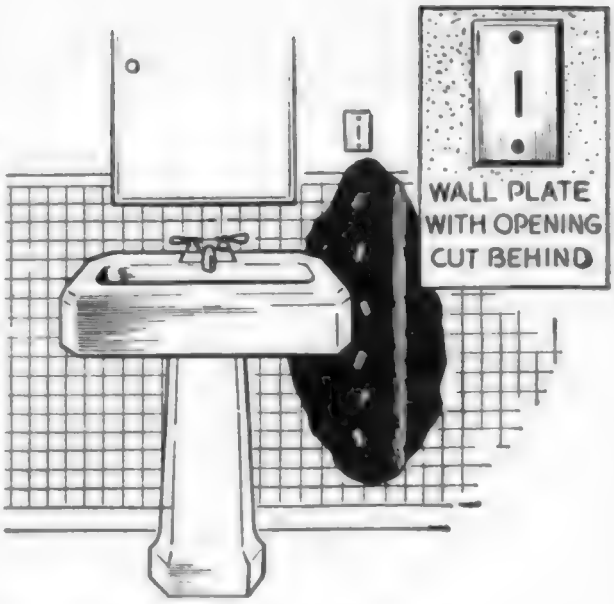
| | |
|---|---|
| Amyl Acetate | 2 oz. |
| Acetone | 2 oz. |
| Heavy Motor Oil | 1 oz. |

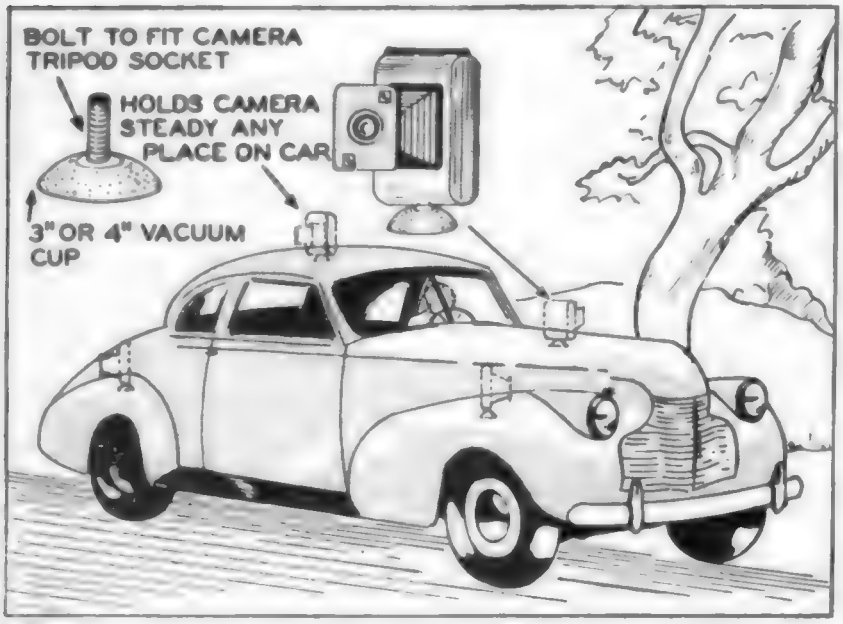
Dissolve the oil in the amyl acetate, then add the acetone, and shake thoroughly. This is one of the very best all round solvents, equally good for black, semi-smokeless, cordite, or any of the high power nitro powders; it leaves the barrel clean, smooth and bright after swabbing. But a coating of it should be left in the bore, and thoroughly re-swabbed a day or so later, as it has a "delayed action" on remaining residue, which is a decidedly worth-while safeguard. This formula was for many years recommended by Lt. Colonel Townsend Whelen, formerly Ordnance Dept., U. S. Army, and has been a dependable stand-by of hundreds of thousands of shooters.

[*Continued on page* 156]

## Old Razor Blades Drop In Wall Slot

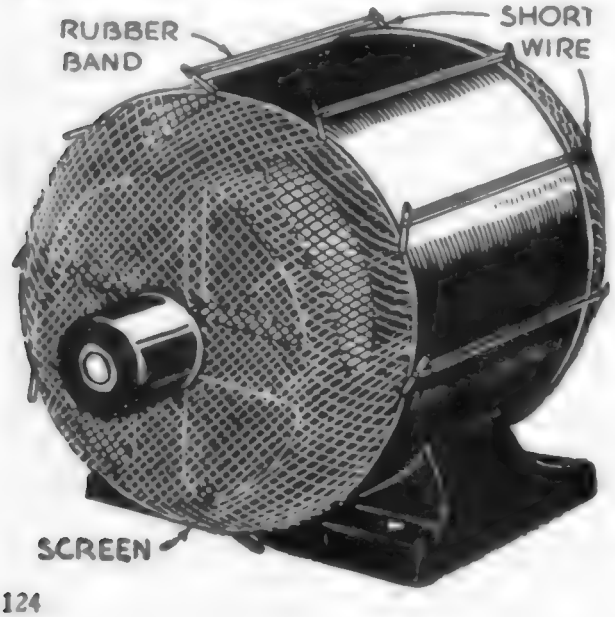
THE problem of disposing of discarded razor blades is easily solved by the walls of the house. A toggle switch plate with a slot in it acts as the entrance to the air space between the inner and outer wall of the house. A hole is made in the plaster and the switch plate placed over it as shown in the illustration. The plate is not at all unsightly and makes the insertion of the blades safe and simple. The blades drop to the floor between the walls and remain there out of harm's way as long as the house stands. This stunt cannot, of course, be used in houses having rock wool type insulation between the walls.—*R. F. K.*




## Suction Cup Holds Camera

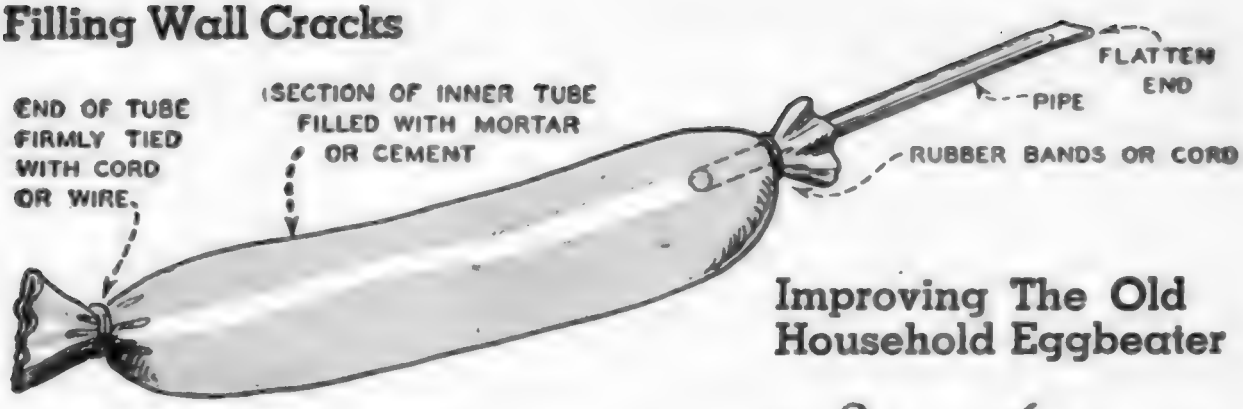
A SUCTION cup about 3" in diameter fitted with a screw to match the camera's tripod hole, will make a convenient substitute for a tripod. It is of particular value to the photographer who is fond of scenic shots. The suction cup may be affixed to the body or windows of an automobile in such a way as to hold the camera in practically any position desired. This is possible because of the variety of curved surfaces available.




## Screen Protectors For Old Motors

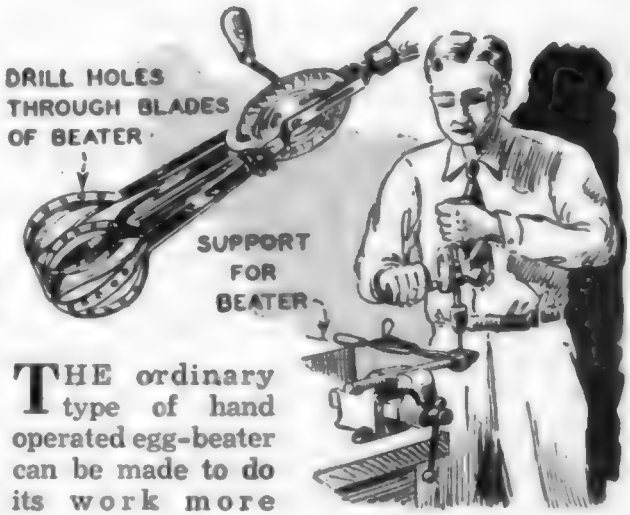
NUMEROUS electric motors used to run shop equipment have large openings in the ends for cooling. This is particularly true of old motors. Metal shearings or wood chips from the shop operations can easily find their way into the motor and cause considerable damage. It is a simple matter to avoid this by making screen covers for the ends of the motors. Such covers consist of circular wire frames with hooks soldered to them at intervals around the circumference. The screening is stretched over these frames and soldered in place. To attach the covers, rubber bands are stretched from the hooks on one to the hooks on the other.

## Filling Wall Cracks




DEEP seams and cracks in plaster or concrete walls usually present a problem when the time comes for repairs. The difficulty consists largely of the inconvenience in reaching the inner portions of the cracks. When working with a flat tool such as a putty knife or the like, considerable plaster or cement is wasted during the process, as the excess falls to the floor or ground. By using a section of an old inner tube much trouble can be avoided. One end of the tube is tied shut with twine after filling, and the other end bound securely to a length of small diameter pipe. The outer end of the pipe is flattened slightly so that it can be inserted in the crack. The inner tube, filled with the repairing mixture, is then simply squeezed.

## Improving The Old Household Eggbeater

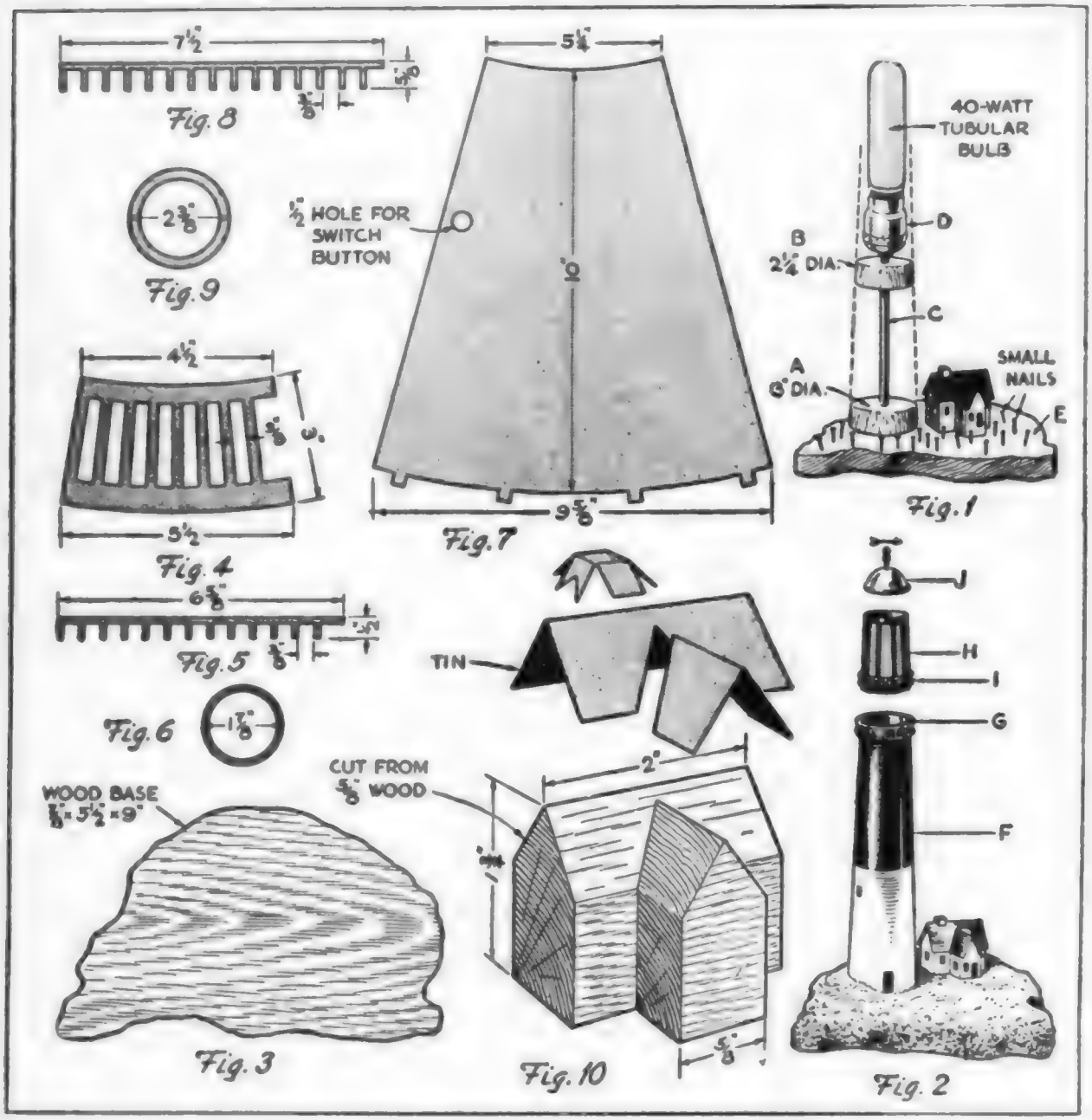



THE ordinary type of hand operated egg-beater can be made to do its work more quickly by boring holes in the blades as shown in the drawing.

## Stunt Flying Model Plane Attracts Attention

HERE is a little gadget that will repay its cost many times during the course of its life as an "attention getter" for a place of business. Any wooden toy airplane such as are sold in the dime stores, will dive about in the wind, when supported by a springy steel wire.—*A. H. W.*

# A LIGHTHOUSE LAMP




AN ATTRACTIVE and useful novelty lamp, in the form of a lighthouse, can easily be made from material found around any workshop with a minimum of skill or equipment. The lamp can be used in a reception hall, den, or boy's room. Fitted with a forty-watt tubular bulb it gives sufficient light for reading.

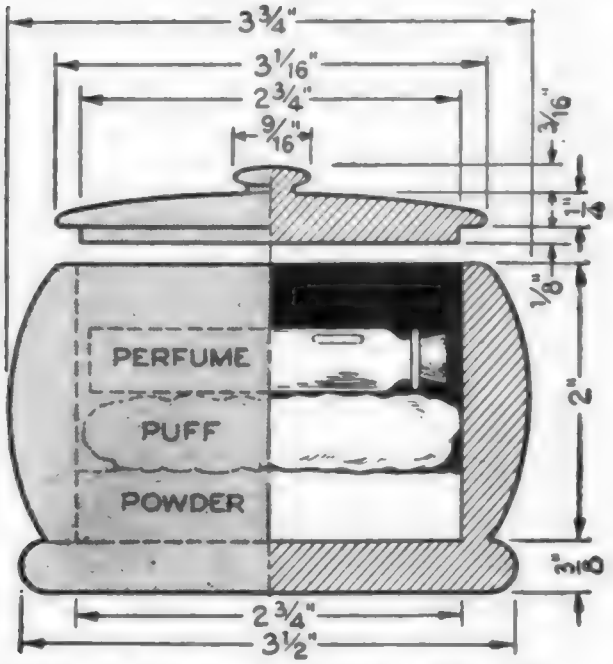
First cut the base, as shown in Fig. 3, from a ⅞" board, 5½"x9". Out of the same material cut the circular blocks, A and B, Fig. 1, 3" and 2¼" in diameter, respectively, tapering the edges slightly to conform with the slant of wall, F, Fig. 2. The blocks will form the frame for the wall. Through the center of each block drill a hole of a size to fit snugly around a 6" piece of ¼" pipe, C, Fig. 1, which is threaded on the upper end.

Insert the pipe into the blocks and screw an electric light socket onto the upper end, running the cord through the pipe. A socket with a short round switch button will be found to be neater than one with the usual flat type, or the chain pull switch.

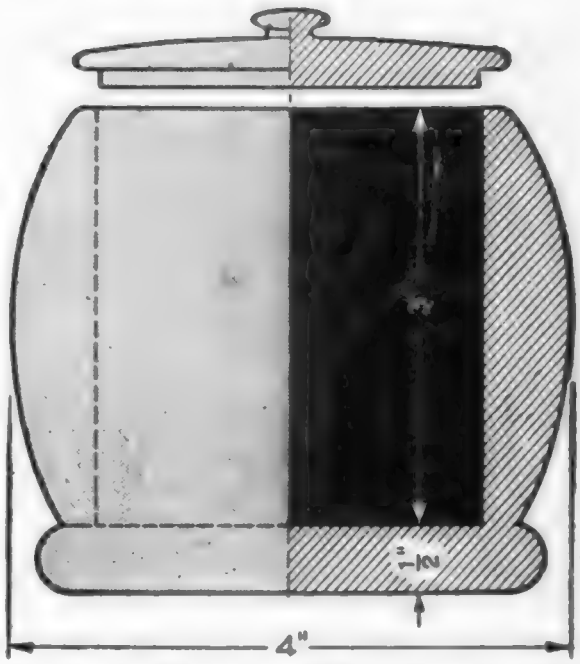
Cut the wall, Fig. 7, out of a piece of tin

[*Continued on page* 158]

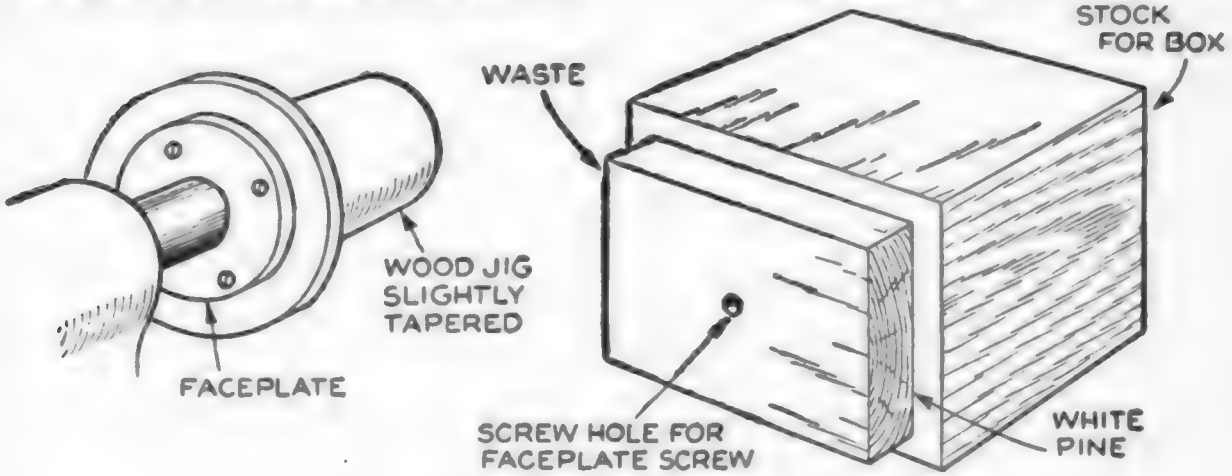
# PROJECTS FOR PROFIT




POWDER AND PERFUME BOX




BATH-SALTS BOX




THESE two turned boxes, when filled, offer the home craftsman a real opportunity to take a swing into commercializing an output from the shop. Sales may easily run into the hundreds if you live in a city, at least into the dozen if you live in a less thickly populated region.

The powder-perfume and bath salts boxes are chosen because every teen-age girl and adult woman becomes a potential prospective buyer. Besides, the boxes are easily turned and like any lathe job, can be turned out fast after you have turned a few and know the steps ahead.

You will find here too, the best way to figure manufacturing costs in advance, how to figure profit. This will mean contacting a wholesale house either locally or in some neighboring city and getting bottom prices, not only on the wood you use (unless you are fortunate in having a supply already on hand) but also on the bath salts, the vialed perfume and the powder and puffs.

Recent calculations give these figures which, as a whole, are fairly accurate. For the powder box, here's the list of expenditures:

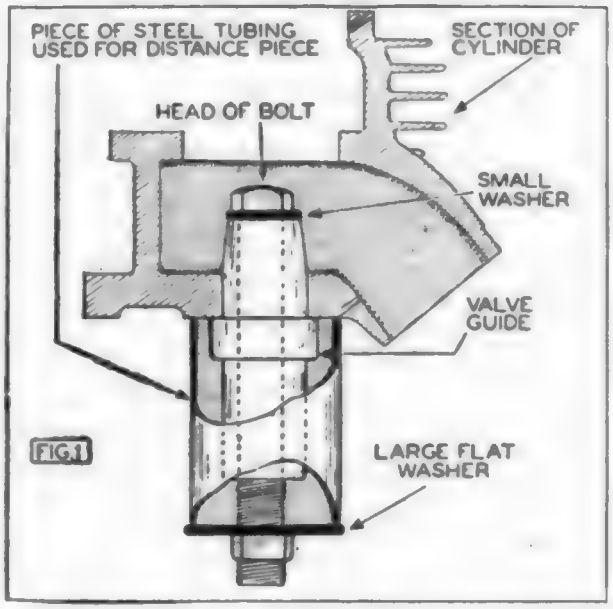
| | |
|---|---|
| Powder | $0.08 |
| Puff | .02½ |
| Perfume | .06 |

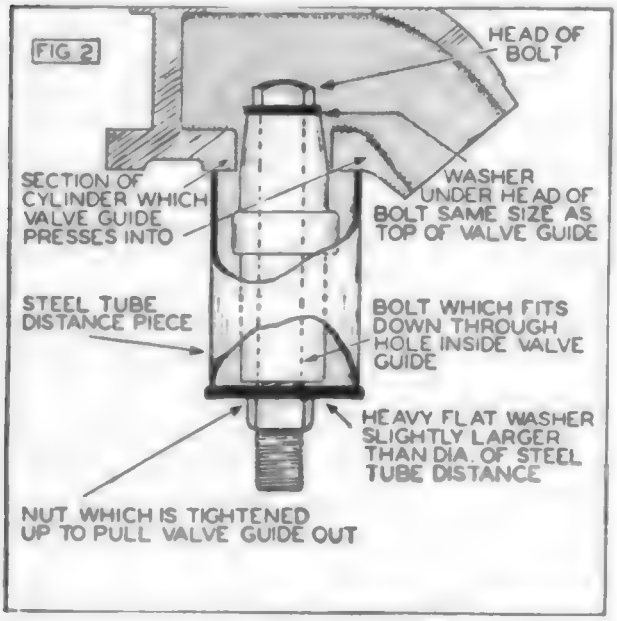
[*Continued on page* 159]

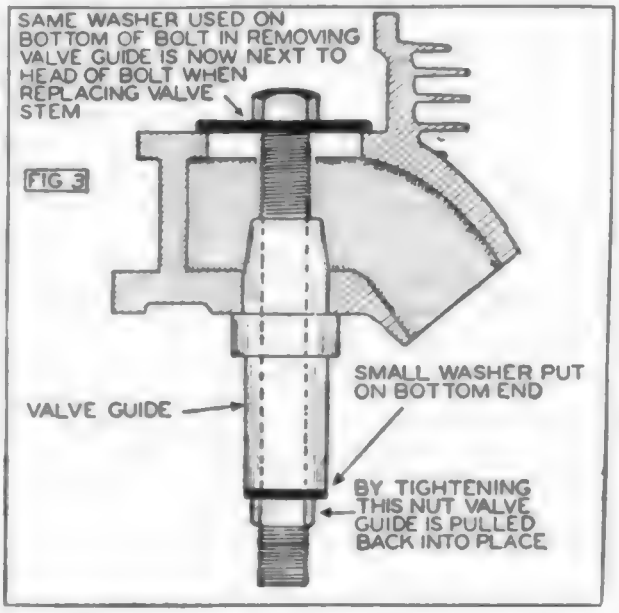
# SOME NEW IDEAS FOR

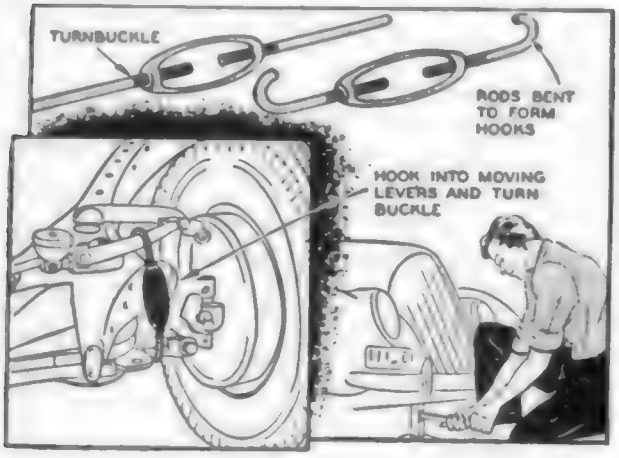
## Removing Valve Guides

THE method shown in the accompanying drawings can be applied to many standard makes of automobile and motorcycle power plants. It will not, however, serve in removing the guides in engines where the guides must be removed before the valves. To remove the guides by this method, the valve must be removed and replaced with a bolt as shown. A piece of steel tube or pipe is placed beneath the guide to press against the upper part of the block, and a washer large enough to cover the tube, is placed over the end. A smaller washer is placed at the top of the valve guide, and the nut tightened. Penetrating oil and a few light hammer taps on the head of the bolt will aid in removing valve guide if it does not come out readily.—*I. J. S.*



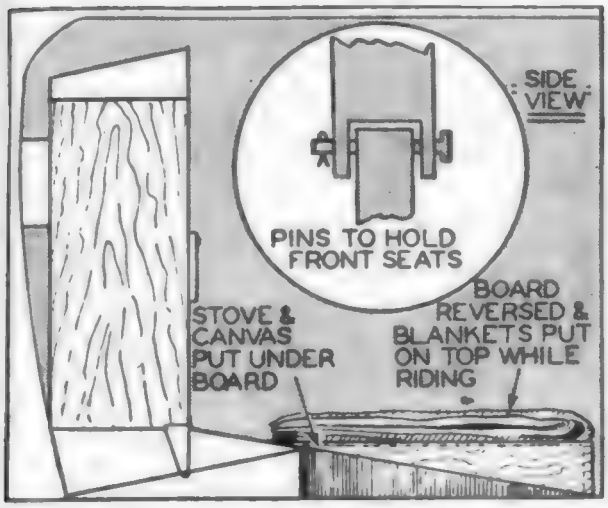




## A Jacking Aid

KNEE action cars sometimes present a problem when jacking, particularly when the proper jack is not available. A simple way of preventing the front wheel from dropping down as the car is lifted is shown at the left. The loops at the ends of a large turnbuckle are opened as illustrated, and formed into hooks. These hooks can then be adjusted to hold the knee action compressed as the car is lifted with the jack. The job is then a simple one.—*A. H. W.*

# THE HANDY MOTORIST




## Auto Stateroom

ANY old model automobile can easily be converted into a combination car and trailer by the simple addition of an interior cabinet of a design similar to that shown. Naturally, the cabinet must be dimensioned and proportioned to fit the individual car in which it is to be installed.

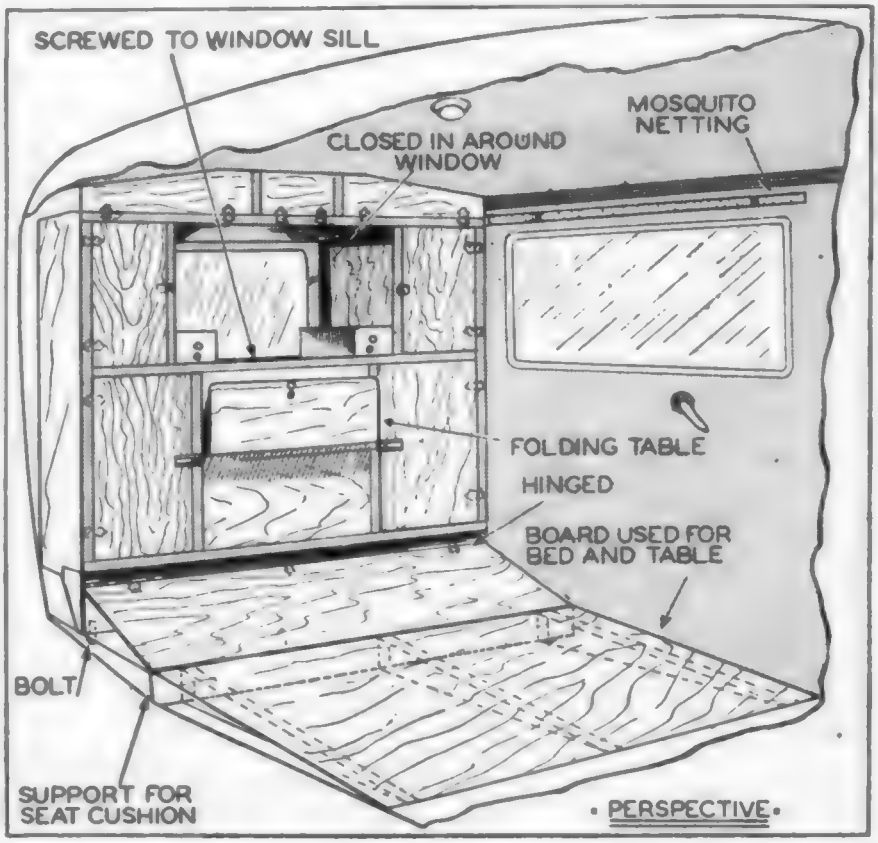
Either indoor or outdoor (waterproof) plywood may be used as the woodwork of the structure is not exposed to the weather. The arrangement shown in the illustrations is a very satisfactory one but can easily be changed to suit any special purpose. One feature must remain as shown, however, and that is the opening or "tunnel" through the cabinet for visibility out of the rear window.

To make the installation the back seat must be removed from the car. The seat support is then covered with a hinged plywood lid which forms the end of the "stateroom" bed. Tapered beams as shown by dotted lines in the larger drawings are then fitted from the forward edge of the seat support to the rear of the front seat. Another piece of plywood is cut to fit on top of these, extending to the sides of the car. These two plywood panels form the basis for the complete bed, the forward one being removable as indicated in the smaller sketch. A piece of mosquito netting rolled up like a window shade should be placed above each of the rear windows to be used as a screen when sleeping in the car.

If additional room is needed other than that provided inside the car, a similar cabinet can be built outside the car at the rear. This can either be supported by the trunk rack or the rear bumper. The outside cabinet, or trunk, must be made from waterproof plywood.

If the equipment is not to be removed from the car at a late date, it is possible to cut through the sheet metal at the rear of the body to make the interior of the outside trunk accessible from within. This is particularly convenient in bad weather.

For extended touring, a "stateroom" car of this type has numerous advantages over a trailer. Although it lacks some of the spaciousness and comfort of a trailer, it is easier and more economical to drive, and is not barred from roads that forbid trailers.



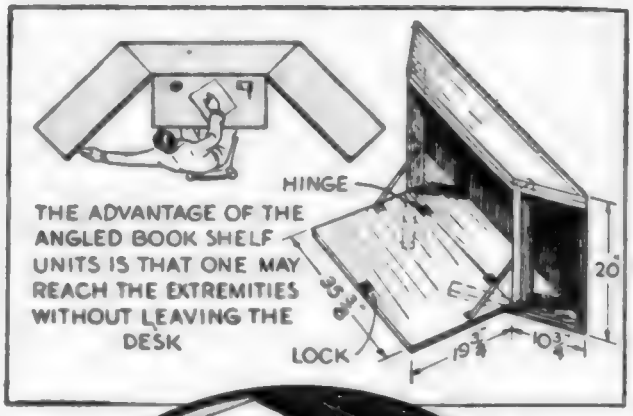
# An Angled Desk-Bookcase

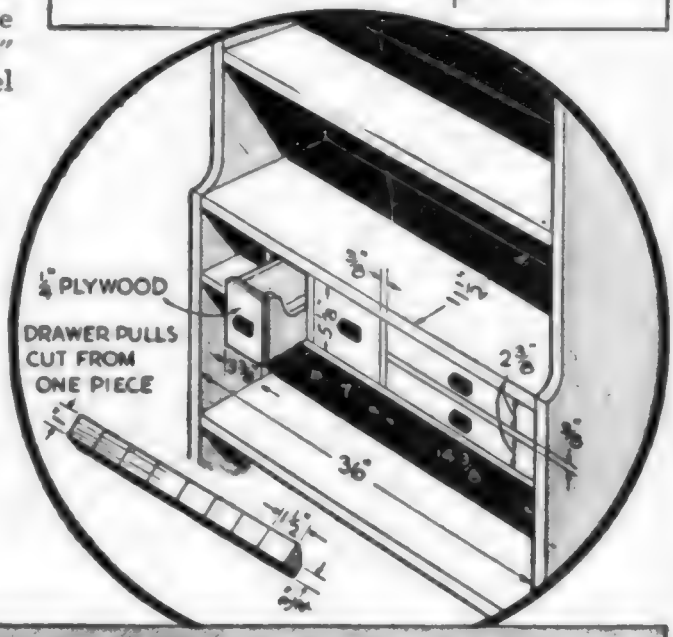
THE unique angled desk and reference shelf is designed for the craftsman who wants to reach any article in the reference unit, shelves or drawers without leaving his chair. Such a unit makes for efficiency in time and labor.

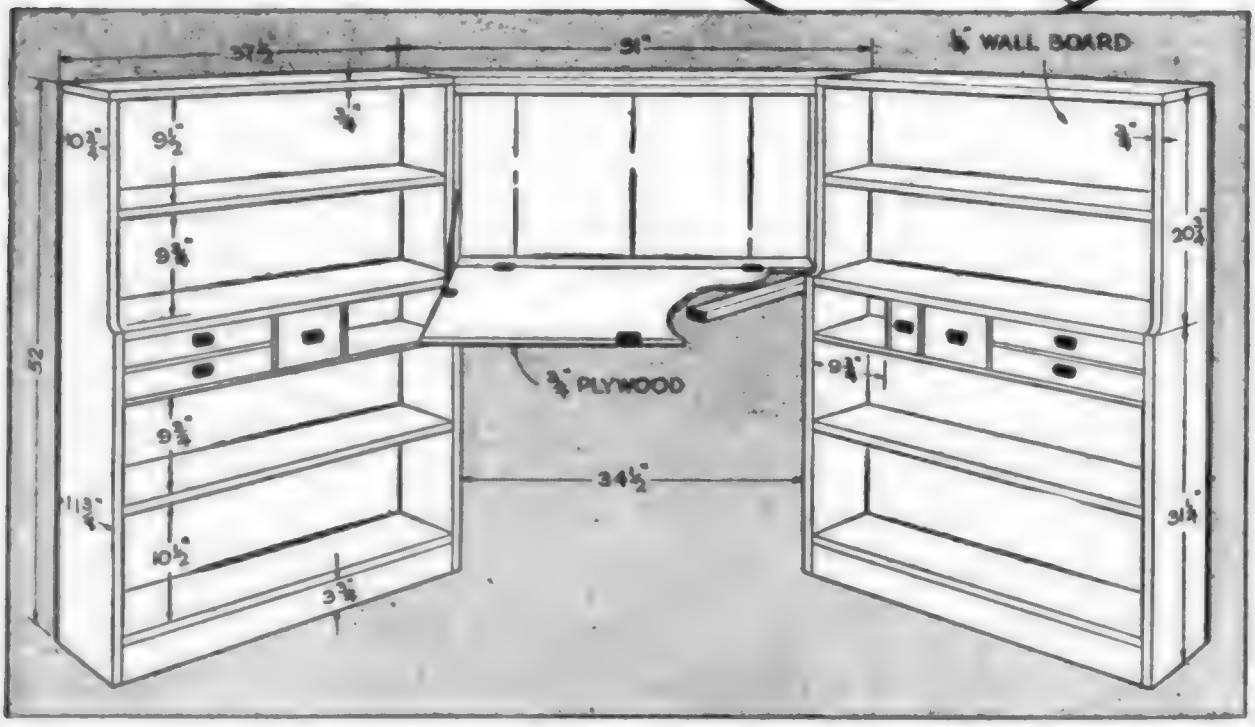
Horizontal dimensions may be varied to suit individual needs of the builder. Heights of various shelves and drawers, as given, have proven in use to be satisfactory for normal use. Additional drawers can be introduced or eliminated. Doors can be placed on the lower book case sections. The unit pictured contains drawers for 4"x6" file cards, compartments for stationery, steel strong box, and book space.

The angled feature of shelf units permits easy reach to all sections without moving from centrally located chair.

The stock bill provides 1" stock of second grade white pine for major portion of material; ⅜" boxwood lumber for light portions of drawers, back of desk, and drawer boxes; ¼" plywood for drawer ends; and 1" plywood panel. Also, ¼" fibre wallboard for shelf backs. Hardware calls for finishing nails, nails, flathead screws, trunk lid braces, hinges, and lock. The quality of the hardware is up to the builder.—*Leroy O. Funck.*



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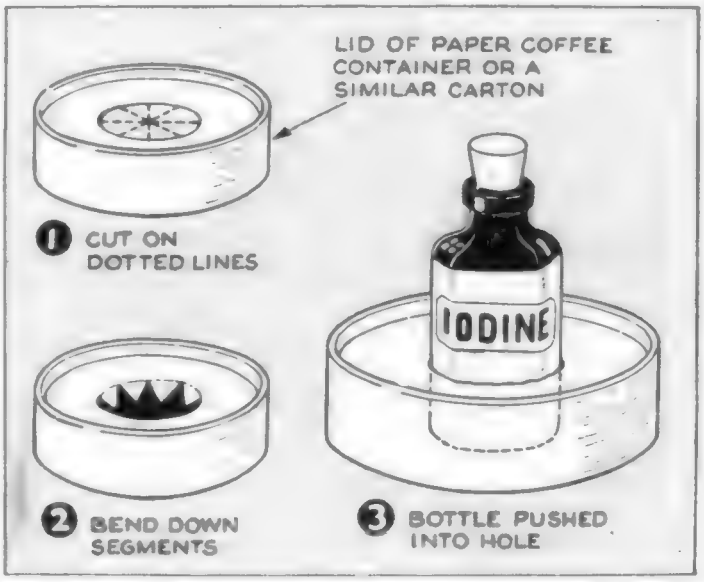
## Rustproofing Tools

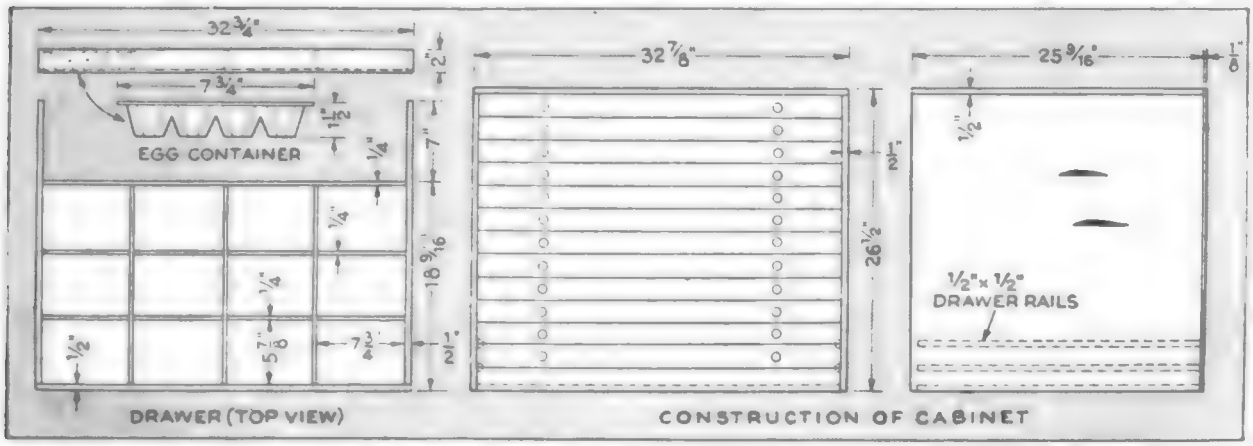
TOOLS that are kept in an outdoor workshop, particularly one that is only temporarily heated, are very likely to become rusty. After the heat is turned off in the winter, the moisture in the air condenses on the cold surface of the tools and causes the rust. Smearing them with oil in the usual fashion, either with a rag or with the fingers, is a messy procedure. By far the most convenient way is that shown at the left. The tools are "painted" with oil with an inexpensive brush. Oil for the purpose may be kept in a tin can in a handy spot in the shop. This system protects the hands and clothes as well as the tools. —*E. A. R.*

## Handy Bottle Holder

SMALL bottles are easily upset and spilled when used frequently or hurriedly, as is often the case with first aid solutions. To prevent loss and inconvenience, they should be inserted into the lids of pasteboard containers of the type used for ice cream. The holes for the bottles are cut in segments as shown in order to grip the bottle firmly. This method of anti-spill protection also applies to nail polish bottles.—*A. V.*




## Assortment Box




CARDBOARD egg containers form the basis for the sliding drawer partitioned box shown. The egg boxes are thoroughly shellacked to stiffen and size them before they are built into the wooden frame. The sections can be used for small objects.—*E.A.R.*

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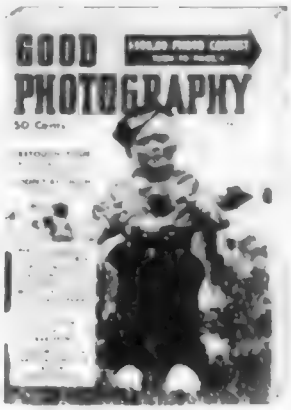

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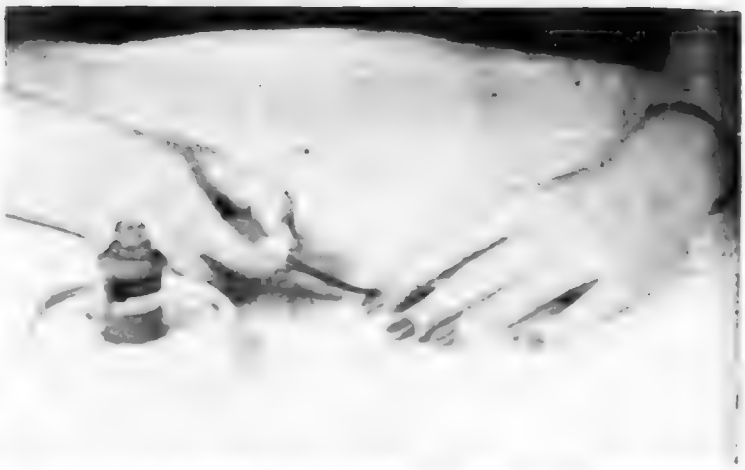
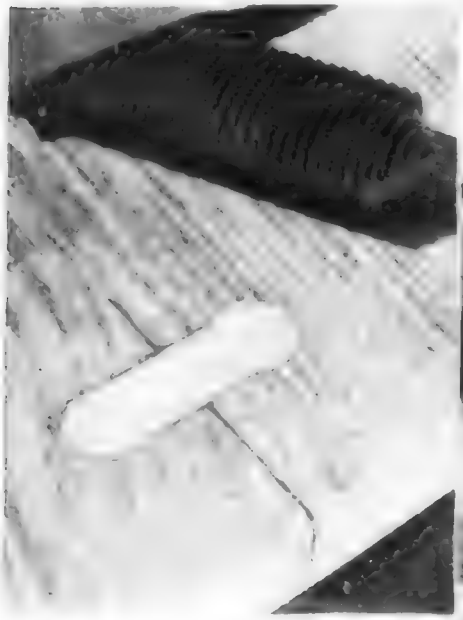
## Container Lid Holds Small Bottles

SMALL bottles, such as nail polish bottles, are held firmly upright if inserted in a hole cut in the top of a pasteboard ice cream container.—*W. S.*





## Lead Butterflies Join Boards

RESEMBLING the wooden "butterflies" seen in antique furniture, these lead ones do an excellent job of joining planks edge to edge. The recesses into which the metal is poured, are made by boring holes part way through the boards at a slight distance from the edges. A narrow channel is chiseled to the edges. Tinned nails are driven parallel to the channels into the sides of the holes. These assure a firm union between lead and wood.

## Jackstones Support Wet Paint Brushes

JACKSTONES, or "jacks" of the variety used by children, are useful in supporting the tips of small wet paint brushes.—*W. S.*

# Patents Universal Curve

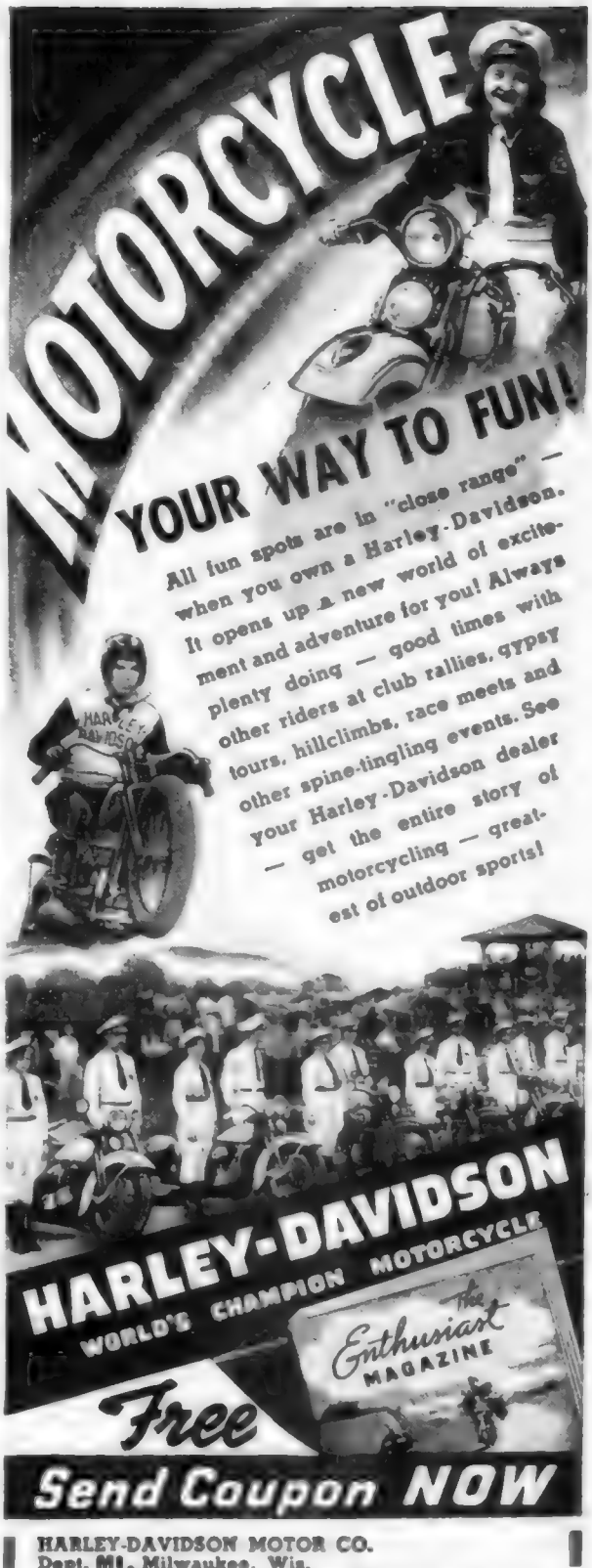
James E. Bell, Jr., of Kansas City, Mo., has patented a device which has been attempted by various inventors ever since 1889.

Bell, now an assistant city engineer, has been wondering why no mechanism could be found on the market that would describe any different radius of arc from a straight line to a full half circle. There were a set of curves which could be gotten and there was a beam compass, which both had their disadvantages.

So, after much strenuous work and unlimited faith in himself, he finally, with the financial help of his father, succeeded in finding the last link which enabled him to complete his long cherished dream at last.

Technically Bell's Universal Curve consists of a flexible band of spring steel connected to a plurality of connecting arms, which by simple mechanical means, flexes the band from a perfect straight line 18 inches long, through different radii of arc to a full half circle of 5.72965 inches in radius.

What at first stumped Bell as well as his predecessors was this fact: By holding a band in your fingers and arching it you will notice that the tension of the band designates it to assume a tangent at the ends for quite some distance. This would allow an arc to arrange itself in the center but as a whole would assume the proportions of a parabola. One day, after experimenting for some time on the application of opposite revolving arms, Bell stumbled upon the knowledge that a point on a line when flexed through different radii assumes the path of a scroll, therefore he had but to establish a controlling unit to compensate for an ever changing radius on the opposite revolving arms in the mechanism.



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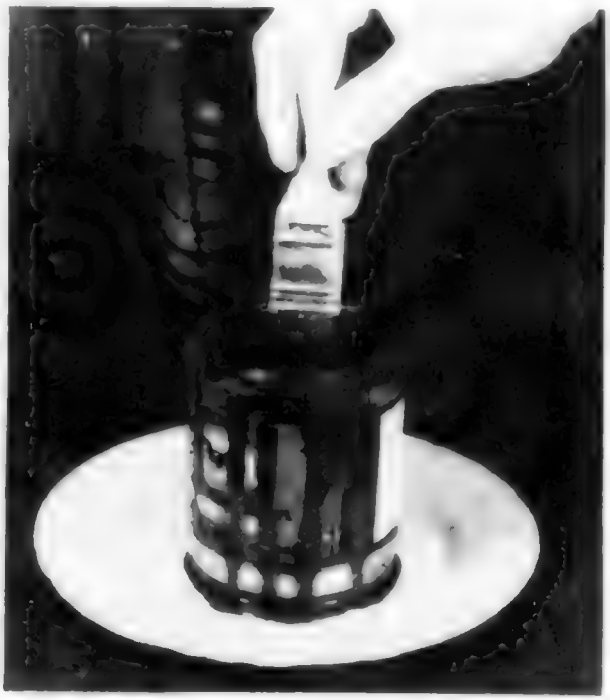
## Beer Glass Vases

WHEN the bases of tall beer glasses are accidentally broken, the glasses can be converted into attractive flower vase combinations. To make the conversion, chip off the remaining portion of the base and insert the narrow bottom of the glass body into a hole bored in a wooden base, and glue.—*F. C.*

## Paper Plate Drip Guard

WHEN painting around the house it is often difficult to avoid getting paint on the floor or on whatever the can is placed upon. A paper picnic plate, placed beneath the can, will prevent this trouble. As the paint drips down the sides of the can it dries at the base, sticking plate to can.—*W. S.*



## Simple Auto Note Pad

A HANDY note pad for the car can be made from an old celluloid glare shield. Remove the celluloid and press a small pad of paper in its place with cardboard backing.

## Lightplane Flies Two Heavyweights

Tipping the scales at 280 lbs., Paul McMurray, right, recently soloed his 230 lb. student, shown leaning against the plane. Despite the fact that the Cub plane in which these two heavyweights flew was powered by a 40 h. p. engine, the course was entirely successful. Claude Jarrett, the student, received his license recently at Ashville, N. C.

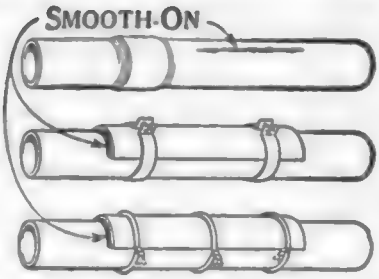
---

The Beardmore Glacier in the Antarctic, believed the world's largest glacier, is about 100 miles long and 15 miles wide.

"Oh, it flies beautifully, but here's one thing I can't quite understand!"


# A "First Aid" for Repair Work

around the house—in the shop—on the car

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# Secrets Of The Nazi Parachute Army

[*Continued from page 39*]

heard no firing, I was sure that our landing was to be a success. Moments later, my feet touched Belgian soil. I spilled the air out of my 'chute, and after assuring myself that there was no immediate danger of attack, folded it into a rough bundle.

Our orders were that if danger seemed imminent, we were to leave our 'chutes and race to assemble as a unit and defend ourselves. If there seemed no immediate danger, we were to fold our 'chutes and carry them with us, to be cached in one place, usually a shallow hole, near the spot where we had landed. The reasons for this are obvious: If we had been unnoticed in our landing, there would be no telltale 'chutes to give us away and send searchers after us; too, if we buried the 'chutes, they could be recovered after our troops had taken over the territory, and used again.

Clutching my ungainly bundle, I trotted toward the spot where our commander stood, about 400 yards away. Already, the big machine gun was assembled, and the last members of the squad were trotting toward us. "We will go into the woods," our commander said, and started at a dogtrot for the trees which bordered the west side of the field. Once in the clump of woods, we stopped, and set to work to dig a hole as a cache for the 'chutes. This took but a short time, and minutes later we were ready to follow our commander. In the distance we could hear the rumble of heavy guns, and once a squadron of British planes roared overhead, flying toward the front.

Our commander studied his map. "Follow me, single file," he ordered. "We will head for the road." He started out swiftly, and we followed in file, the three men with the machine gun bringing up the rear. Deeper in the woods, the ground was thicketed, and our earlier pace was retarded. I dropped back to relieve one of the men carrying the gun, and, with the other two, fell back from the single-file group which forged on ahead. When we caught up, they were assembled in a group, at a spot where the woods ended on open ground.

"The road is over there," the commander said, pointing across fields. "We will keep low and advance to within fifty yards of the road and lie there and wait for the enemy. We may be able to disrupt an ammunition convoy, or—" and he smiled, "perhaps we can make it hot for retreating troops!"

Crouching low, we made our way through the tall grass, ready to drop to our bellies at the first hint of an approaching enemy. I had been relieved at carrying the machine gun, and as I advanced with my comrades, I looked forward to what might happen if the enemy should come down the road. We could have blown up the road, but the course our commander was taking was far more sensible. If we blew up the road, trucks of an ammunition convoy could circle around through the field, and the noise of the explosions would undoubtedly call attention to our position.

By waiting for an ammunition convoy, or a detachment of troops advancing to the front, we were assured of doing far more damage to the enemy. If, on the other hand, no enemy should appear, the road would be in good shape for our own panzerdivisionen, after they had broken through.

Arriving at the spot where the commander had stopped, we sat down on the ground for a brief parley. When all the men had come up, including those carrying the machine gun, we received our last instructions. "You will spread out over a space of about one hundred yards, parallel to the road," he ordered. "Have your grenades ready in case enemy motor transports or ammunition trucks show up. In the event that it is infantry, on foot, we will let the machine guns do most of our talking. If we are attacked, we will make a retreat to the woods and hold them off as long as possible. You have been trained well. This is your graduation. Heil Hitler!"

We disbanded to take positions as ordered, about ten yards apart. Lying there, on my belly, I reflected that we were but one of the fifteen groups that had left the air field at dawn. Some of those groups had undoubtedly been wiped out; others, probably, were lying in wait, near some road, ready to blow up an ammunition convoy or make a surprise attack on marching infantry, just as we were doing; and still other groups, I thought with satisfaction, would have already inflicted tremendous losses on the enemy. The philosophy, ingrained in our parachute troops, was to expect death—but to make sure that enough damage had been done to the enemy to make that death worth while!

My reflections were interrupted by a call from the man at my left. "They're coming," he called. "It looks like ammunition." I relayed the information to the man at my right, and clutched a grenade tightly in my right hand. Down the road, raising a cloud of dust as they came, roared the enemy trucks. They were parallel to us when I heard the commander's whistle, our signal to let go with the grenades. Rising, I drew back and hurled mine at the road, almost simultaneously with the missiles of my comrades.

If there had been any doubts in our minds as to whether the trucks contained ammunition or not, they were immediately dispelled by what followed! There was a blast which seemed to shatter the very earth with its violence. I was knocked down by the force of the explosion, but as I fell I could see trucks bursting into a thousand pieces, like monstrous shrapnel. It was horrible to contemplate the fate of the men who had been driving them!

[*Continued on page 140*]

# Editor's Workbench Chips

[*Continued from page* 33]

club mates. Why not use MI as your clearing house? Merely send us your name and address and we'll list them each month in a special section of the "Editor's Workbench." There may be a dozen other would-be pilots in your own town or in neighboring ones.

* * *

## Ado About Nothing

Some of the Washington columnists are getting all excited and are screaming "It's regimentation, it's dictatorial!" because the Federal Communications Commission is finally enforcing certain licensing provisions regarding radio operators that have been on the books for more than twenty years. Amateur (and also professional) radio operators are now being asked to furnish proof of their citizenship and also to be fingerprinted. Formerly, a question on the license application blank read, "Are you a citizen of the United States?" and the applicant merely wrote "Yes" or "No." If he was foolish or honest and said "No," of course he didn't get the coveted ticket, but if he said "Yes," he got it without further question. This was a pretty loose system and a matter of common gossip for a long time, but no one worried about it particularly because radio "hams" in general did so much valuable technical research work and provided life-saving communication facilities during floods, hurricanes, earthquakes and other disasters. The general tightening-up of the rules is simply a sensible part of the new defense program; it's no secret that amateur privileges and licenses are being abused by representatives here of foreign governments who have long been amused by the easygoing nature of the licensing procedure.

The people who are calmest in the whole matter are the radio amateurs themselves, some 55,000 strong. They're responding to the long and involved questionnaires with great enthusiasm and they're willingly smudging their fingers with ink. One of the hidden blessings is that a lot of dead wood will be cleaned out of the amateur lists and that station call letters unused for years will become available for assignment to newcomers.

Because so many readers of MI are interested in radio and because even more of them would like to spend a lot of time eavesdropping on the short waves, we are planning to run a series of articles telling how to learn the radio code and how to go about applying for operator's and station licenses. The code is very easy to master if you start the right way. There is actually a case of a girl only nine years old who passed the government test successfully. There is no charge of any kind for the licenses themselves, no restrictions as to age, sex or physical condition. The code article will appear in our forthcoming November issue. Look for it!—*Robert Hertzberg.*


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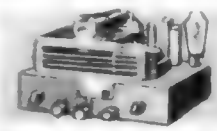

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Name.....

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City.....

# Fooling The Fishes With Science And Skill!

[*Continued from page 47*]

At 60 feet Miller can knock the ashes off a cigarette; at 150 he can drop the fly neatly within a 30-inch ring. This accuracy and skill enables him to make his fly act like the real thing, and is to no small extent responsible for his success in catching fish.

Along with casting skill must go a knowledge of the habits of fish and the insects they feed upon. Miller has spent years of study on these things, and in his workshop is a well-equipped laboratory for analysing water samples from fishing lakes and streams, for upon the alkaline and oxygen content of water largely depend the habits of fish and the conditions of insect life.

"There's always a reason why fish bite or don't bite," he says, "and one of the chief factors is water temperature. Not long ago an angler with a thermometer would have been laughed at. Today every good fisherman carries one. I always have along a barometer as well. In cold water, below 50 degrees, you won't catch many trout because they are more or less dormant. From 65 to 73 degrees is best, for in warm water they are sluggish again. At low temperature there is no hatch of flies, and what feeding the fish do is on the bottom, on nymphs or aqueous insects. In warm water, trout are near the top after the flies that are there.

"A trout is never completely dormant, though. It's his nature to eat all he can with the least possible effort. So, if the food's on the bottom, that's where the trout will be, and vice versa. In warm water the lure must be presented close, temptingly. The fish may be in a pocket waiting for food to float by. You can either float it by, or you can lure the trout to the top with tempting falsecasts. Clear water means wary fish, and you must avoid shadows, use a long delicate leader from 12 to 15 feet in length, and get lifelike action to the fly.

"If you know the effect of water temperatures on the trout and on the insect life, and fish accordingly, assuming that you have the skill to simulate the movements of the fly you're using, you'll get them.

"A lot of trout fishermen never think of fishing the easily accessible places, but always pack back away from the beaten track. They catch fish, of course. Anybody can catch them there. But if you really know your angling, you can catch the educated trout in the roadside streams."

The following incident illustrates the point: At one of the pools near Los Angeles where you pay to fish at so much per fish, Miller was recently invited to give a demonstration. The joke was that the trout were super-educated, had been fed on liver for some time past, and the best efforts of all anglers failed to interest them. Here, they thought, were some trout which neither Miller nor anybody else could catch. On arriving, Miller noticed that the fish showed a sluggish interest in a hatch of white moths, one of which occasionally fell into the pool. He selected a fly—a moth—and began to cast, dipping it nearer and nearer the water temptingly. When it touched, a big one was waiting, and took it. Before he stopped, Miller caught over 40 trout, and the joke was on the jokers.

"Join a good casting club," is his advice to all anglers, "improve your casting, learn all the facts you can about the habits of fish and insects, and you'll seldom have a failure."

# Secrets Of The Nazi Army

[*Continued from page 138*]

Rising, I ran to where the commander stood. "Retreat in order to the woods," he snapped. "Those trucks are filled with infantry," he said, pointing to trucks back down the road, which had escaped the explosion. As we looked, we saw men already piling out of the trucks and running toward us. Our machine gun, manned by two of our men, tried to protect our retreat, and succeeded in mowing down dozens of the men, who turned out to be British soldiers, and not, as some of us had thought, French. But there were too many of them. An explosion, small after the one we had caused, told us that a grenade had finished our machine-gunners.

We raced for the woods, crouching low and running in zigzag fashion, but it was no use. I saw two of my comrades fall, and a moment later was spun around with the impact of a bullet in my arm. For me, and for most of my comrades, the war was over. (Later, I found that of the sixteen, but three of us survived—thirteen, including our commander, met death in that ill-fated retreat.) I knew that I would be taken prisoner, and that my part in Germany's successes were over.

But even with the pain in my arm, I was able to smile. We had accomplished a mission. The ammunition which we had destroyed would never harm a soldier of the Fuehrer! And by destroying it, we had, perhaps, crippled the defenses of the enemy sufficiently to allow our powerful mechanized divisions to smash through. We had delayed motor transports of British infantry at a time when their presence was most urgently needed to stem the advance of our great offensive.

No, we had done what we had set out to do, and we had paid the Fatherland well for the time and money he had spent in our training. Later, in a British prison camp, before we were sent to Canada, I heard the news of the fall of Paris, and I thrilled to the thought that I had been a parachute trooper, a member of that glorious service which played such an important part in Germany's victory!

Boo Boo

## Business Hums At This Bar!

[*Continued from page 42*]

colored birds came the idea for the first edition of the bar. But to lure the hummers away from the shrub and vine blossoms of the canyon he had to advertise his nectar. This he did by hanging long glass tubes of the nectar on the bushes at some distance from the cabin, and gradually moving them in closer. It took only a short while for the hummers to catch on to the idea, and in no time the tubes were requiring almost hourly attention to keep them filled. This called for too much time and footwork, and Mr. Tucker set about to devise a self-serving bar of greater capacity.

After much experimenting and many changes the fountain now in use was worked out. It consists of a long-necked carafe with the opening inverted into a jelly glass. Over the glass is a metal cover with perforations around the outside edges, just large enough for the hummer's needle-like bill to enter. Soldered to the cover are four projections running out about two inches, to which are fastened a wire forming a circle around the glass. The birds perch on this wire while drinking.

Remaining motionless while feeding was something new to the hummers, but they soon became accustomed to putting a foot on the "rail."

Summer is the busy season for the bar, but it remains open the year round. The birds begin to arrive in February and stay until October, when they migrate south, except the Annas. The Annas, the best known of the western hummers, remain throughout the year. This specie is in a class by itself so far as other hummers are concerned. It actually sings. Its song, which is nothing much to boast about, is a series of weak, high-pitched notes that might be compared to the noise of a cricket or the filing of a saw.

The Costa, the same genus as the Annas, also has a characteristic which distinguishes it from the others. The male's courting flight is not from side to side, pendulum-fashion, like the Black-chinned hummer. Instead he flattens his body, flares out his tail, and darts forward and back before the female with clock-like regularity, keeping up a rhythmic drone, which rises and falls as he shoots back and forth. The female watches the antics with a look of mild boredom, perhaps feigned.

The most brightly colored of the visitors at the cabin is the Rufuos. The male, about three and one-half inches long, is a bright cinnamon, the head flashing green lights, and the breast below the gorget is white. This migrant does not tarry long, but flies north to Alaska with his tiny mate to raise their brood.

The Black-chinned hummer appears to be the least timid of all the species. They frequently come close to the cabin to build their nests. It is easy to distinguish them by their velvety black chins, edged with a purple band which flashes blue and green lights, and is, in turn, edged with

[*Continued on page 143*]


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# He Propelled His Way To Success!

[*Continued from page 63*]

to work he had some misgivings because it was a gigantic job in comparison to others, and to fail by even a small mistake would probably jeopardize the future of the business. But the result was happy, because when the first propeller had been installed and test runs made, engineers for the ferry company fully endorsed the job. Young Harold said his error was less than ten revolutions, which he corrected on later jobs. All other boats of the company went through the process, resulting in on-time schedules and great operating economies.

The average person thinking of a shop working on boat propellers usually thinks of giant crane and immense dry docks. It only takes a machine shop and a propeller to do propeller work, so that is why a propeller taken from a boat at South Hampton, England, may find its way to the little propeller shop on the banks of the Manatee. Most of their work comes in by freight. They have one of the largest stocks of propellers in the country, with several thousand arranged on the walls.

This section of Florida probably contains more small boats than any other similar area in the United States. There is a constant stream of small propellers coming to the little propeller shop by parcel post, by truck and by express. The instructions are as varied as the hulls which they propel. Most of the jobs are for repairing bent and broken blades, reboring to fit other shafts and pitch changing. There are many racing boats in Florida waters and it takes a propeller to push a racing boat. Many of these speed boats present them with interesting problems in working out the details of wheels that will gain a little more speed for these boats which resemble nothing more than a passing flash of salty spray.

Many boat owners, Harold Stoehrer says, are unaware of the importance of the propeller on their small boats, seeming to regard a propeller as a propeller and that's all there is to it.

The secret of efficient propulsion by water screw, he claims, is the proper relation of the many variable factors to one another. For the uninitiated the main points of a propeller are: Diameter, which means the size of the circle the tips of the blades describe when they revolve. Pitch is the distance in the line of the shaft in which the propeller would move ahead in the water in one revolution, if there was no slip.

If there was no slip—that is the question. If the pitch of a propeller is 12 inches, in theory, it will move forward 12 inches with each revolution, less the amount of slip.

Slip might be defined as the amount of fuel spent by a steamship company for which it receives nothing. Always there is some slip but when there is a minimum of slip there usually is a maximum of efficiency. There can be 100 per cent slip, when the propeller churns but the boat doesn't go. Anyone can see the thousands of things which could easily promote more of undesirable slip, such as bent blades, wrong pitch, wrong diameter and wrong application for boat bottom or right for bottom and wrong for engines. The combinations of possible wrong numbers are almost endless. The shape and angles of a boat's bottom are important elements.

While there are so many wrong things to induce slip, the troubles which wrong applications induce in other parts of the boat are almost endless. Imperfect propellers cause excessive vibration, slippage, whipping shaft and great loss of power. A whipping shaft plays havoc with the stern bearings, makes it almost impossible to keep stuffing boxes packed or from leaking and damages the engines.

Since establishing their business the Stoehrers sell new propellers and have about 80 sub-dealers who sell propellers and take propellers sent to them for repair. Most of this business comes from small boat owners. Many times a boat propeller used for a light pleasure boat is changed to a slower moving hull probably carrying greater loads, so it is necessary to change the pitch, which would in effect give it a lower ratio.

They make all possible changes desired in propellers but do not advise a change in pitch of more than 25 per cent. The yacht owners and sport boat operators using this propeller service reads like the social register.

Their complete line of service includes straightening blades, and adjusting pitch; pitch and diameter changing; refinishing and polishing; static balancing; necessary welding to renew blade edges.

Harold Stoehrer says he has been more than ever convinced of the truth of the statement that 90 per cent of marine propellers are imperfect. He also is convinced of the impossibility to judge the condition of a propeller with the naked eye, but that special devices and instruments are necessary to reveal and remedy propeller discrepancies.

His father, Harold, Sr., is now associated with him in the business and they both credit the depression with part of their success because it kept Junior from going away to college!

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In some regions of South Africa, wild animals plague automobile drivers at night by blocking roads and becoming blinded by car lights; but only the rhinoceros is considered dangerous, provided motorists stay inside their car.

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It takes 50 years of ordinary "trying out" to prove the full commercial value of a new apple, pear, or cherry variety, but short cuts are being evolved by plant scientists.

## Business Hums At This Bar!

[*Continued from page* 141]

a narrow band of white. The Calliope, too, has its distinguishing feature—the smallest bird in America. The male, scarcely three inches long, is beautifully marked; metallic green on the back, under parts white, tinged on the sides with brown and green.

The nest of the hummer, a work of art, is built by the female, the male apparently shirking this duty. It is a cup-shaped affair of fine plant-down, felted together with spider webs, and saddled to a twig or other support, from a few feet to twenty feet from the ground. They vary in size, but are usually about one and one-half inches wide and one inch deep. Two eggs, bean-like and white, are laid and brooded for two weeks.

The young birds stay in the nest for three weeks, and are cared for entirely by the mother, who feeds them from her long needle-like bill of the nectar she has gathered. The male shirks this duty also, and is rarely seen in the vicinity of the nest.

Other birds are not forgotten at the Tucker ranch. Supplies of colored floss are hung on the low bushes to provide easily gathered nesting material, and grain is placed in hoppers within sight of the cabin. Upwards of five thousand quail come to feed each evening during summer.

Bird houses are made by Mr. Tucker in his wood-working shop (another hobby), and hung in the live oaks and sycamores about the cabin. Peculiarly, the size of the entrance to the houses fairly well determines what specie will occupy it. An opening just large enough to admit the homeseeker is usually chosen. One of greater size would invite trouble, larger birds might enter and destroy the nest or the young. During the past season thirty-nine species of birds made use of the houses, but not a hummer among them.

## 5 Miles Up—On The Ground!

[*Continued from page* 58]

enough oxygen and enjoys life generally. Hence, when you fly in any of the giant continent-spanners now being manufactured, the pressure in your cabin will decrease until you approach the 10,000-foot mark. Thereafter, no matter how high you climb, it will remain the same, blowers and valves keeping the cabin's interior pressurized.

To make sure no cabin will "explode" when the giant liners are floating along from three to five miles up, thousands of checks are made, both on the ground and in flight.

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A penguin can sleep standing up, using the tail as added support.

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Sealing wax is not wax; it is shellac and rosin plus coloring matter.

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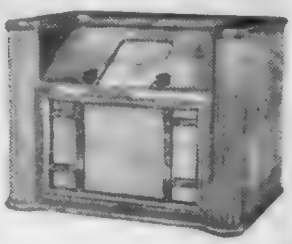

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only 10c

# Her Inventions Are Cleaning Up!

[*Continued from page 80*]

from the biggest department stores in the country.

Miss Byington, because of the demands of her career on stage and screen, has of necessity been separated from her daughters a good deal. Since she couldn't be with them she tried to make up for it by sending them presents, all the things young girls adore, perfume, underwear, etc. Then they were married. Their mother still continued to send them presents but they were of a different type. She wanted to give them gifts they could utilize in their new homes.

The inspiration for her inventions came when Lois, as a bride, wrote her letters confiding some of the household chores which bothered her most —the annoyance of trying to wash milk bottles and vases with dish cloths which didn't really get them clean, the backbreak attendant on scrubbing the bath tub, the nuisance of getting red eyed and weepy every time you peeled onions.

This was Mother Byington's cue to see if she couldn't work out some time and energy saving household gadgets. She had some time on her hands before she went into her latest picture *Episode*, with Olivia de Havilland at Warner Bros., so she went to work. Through some friends she met Claudia Johnson, formerly a decorator, who had the new idea of making some household helps with sponge rubber. Together they schemed and worked and perfected the "Scrubbies" and had a lot of fun doing it.

All these "convenient gadgets for inconvenient places" as Miss Byington describes them are made of a special, long wearing sponge rubber. All the Scrubbies are made of green rubber with green lacquered handles because that color doesn't clash with any other. Scrubby No. 1 is the Kleen-A-Glass, a miniature mop with a twelve inch handle.

Next there's the Sav-A-Soap, which has a pocket on the back to contain all the odds and ends of soap housewives accumulate and which will whip up a nice lather to wash dishes. This may also be used for washing the slats of Venetian blinds, and if you're so inclined, for washing your back.

For that nasty old ring on the bathtub there's the Sav-A-Bak brush with a long adjustable handle so that you can clean out your tub without changing from a standing position. This Sav-A-Bak has also been used to wash walls and automobiles very successfully. The Sav-A-Dust is a triangular shaped sponge on a thirty inch handle which is handy for dusting the legs of tables, backs of radios and cabinets, as well as for washing or dusting odd corners.

On the novel side are the Sav-A-Tear onion blinkers, also made of rubber with rubber ribbons to tie them on. They were originally designed with the idea of wearing them to keep the eyes from watering when peeling onions. However, they're most popular for under water swimming..The last Scrubby is Clean-A-Bottle, a very narrow sponge on a long handle, which was designed especially for cleaning out narrow necked vases or bottles, thermos bottles, jugs, etc.

The Kleen-A-Glass is also very efficient for removing dog hair, angora, etc., from clothes. Since all these brushes can be sterilized with soap and disinfectant solutions, they can be used for all household purposes.

Working with a chemist, Miss Byington developed a cleaning powder which not only cleans but leaves a delicate aroma and is a water softener as well. This new product is called Sav-A-Roma.

With no factory available, Miss Byington and her friend converted a backyard chicken coop and a garage into workshops, where she and one or two girls started making the gadgets. Now eight are employed full time.

The Scrubby dolls and their instruments of warfare on household work were shown for the first time in the windows of a Hollywood department store. They created so much comment that Miss Byington has now been approached by several people with the idea of putting a smaller version of Scrubby, who was only intended as a merchandising item, on the market as a doll.

### (Correct Answers to Quiz on Page 69)

1. True.
2. False.
3. True.
4. False. Neon was discovered by Sir W. Ramsay and W. W. Travers.
5. True. It is an alloy made up essentially of copper, zinc and nickel.
6. False. A tent fly is a part of a tent.
7. False.
8. True.
9. True.
10. True.
11. True. They are groups of cells in the pancreas.
12. False. A nightshade is a weed.
13. True.
14. False. A bathometer is an instrument for measuring the depth of water.
15. True.
16. False. The heliotrope is a flower.
17. False. The gaff of a sailboat is a spar.
18. True. The machine was made by Langley.
19. True.
20. False. Outboard motors are usually water cooled.
21. True.
22. False. The term "hypoid" applies to the shape of the gears.
23. True.
24. False.
25. True.

## Giant Camera

[*Continued from page 68*]

pleted airplane are reproduced in outline on "loft layouts," which are large sheets of aluminum alloy coated white on one side. On these layouts all final details are laid out in pencil. Openings to reduce weight of the structure, ribs to stiffen weak points, spotting holes for critical attachments to adjoining members, riveting or welding flanges, and the like, are all added. Few dimensional details are necessary on these loft layouts, since the sections are drawn in full scale. When a loft layout is finished as a drawing, it goes to the giant camera and as many copies as necessary are struck on whitecoated metal sheets which become duplicates, the original going into a file for permanent record.

The duplicates go throughout the great plant to perform their vital functions. Tool design gets at least one, sometimes more. The design is transferred to a sheet form, or template in the case of parts which must be cut from sheet metal. The templates form the guide for rapid cuttings of the final parts. In the case of die-stamped parts, the duplicates are used as the basis for cutting of the dies. Other duplicates are used to guide the fabrication of jigs of all sizes in which subassemblies and final assemblies are made with hairline precision.

One or several of the loft layouts are sent to the production department to keep constant checkup on the arrangements of fixtures and assembly of the parts. Others go to the different classes of engineers who must plan their work. The new process eliminates the many errors which crept into the old style of redrafting each loft layout several times.

Once an original drawing is checked carefully, no further error can be made because each reproduction is exact. Changes may be made, if needed, directly on the reproduction. This has been an important feature, for no matter how careful a draftsman may be, he cannot duplicate a drawing exactly, his lines deviating in minor degrees from the original.

The photographic system also is of very great value in the making of "mock-ups." Since a full-size model of every new type of airplane must be built first of wood to give engineers, tool designers and production planners their final information, the ability of the camera to photograph drawings directly onto the surface of both painted and unpainted wood saves time and effort and insures accuracy. The full-size wooden form is the mock-up. As a result of the photographic process, craftsmen in the big woodworking shop can work directly on many of the mock-up parts without constant reference to drawings or the delay of making multitudinous measurements and reproducing different and complex curves.

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SYNCRO DEVICES INC. 747 BEAUBIEN ST. DETROIT

## Real Air Conditioning

[*Continued from page 85*]

circulates air over the coils containing refrigerant. This refrigerant absorbs heat from the coils which, in turn, absorb heat from the air. This enforced circulation of air is part of the answer to the question of how a small system like this can refrigerate such a large "ice box" as the interior of a car. Of course we must remember that the motorist merely wants to be comfortable, not chilly. That's different from freezing ice cubes. Those who have been enjoying the summer in their new weather conditioned cars find that elimination of moisture brings the most noticeable comfort.

When this system is installed at the factory Packard engineers use special insulation for the car's body so that the system is more efficient. This also is useful in excluding external noises from the exhaust system and the tires. The compressor is attached to an extra bracket on the engine head and is driven by an additional belt running from an extra pulley driven by the same belt that operates fan and generator.

In this unit refrigerant is compressed to 180 pounds per square inch. It enters the condenser which looks like an extra radiator mounted so as to catch the cooling outside air sucked in by the fan. Here the refrigerant is cooled to a liquid. Next it is forced under pressure to a receiver or reservoir from where it is sent under high pressure through a smaller tube to the coils at the rear of the car. In this step the refrigerant goes back into gas form again. In this change-over from liquid to gaseous form the refrigerant absorbs heat from the coils. That, in turn, takes heat from the air around the coils.

Actually the effect is the same as running ice water through the coils.

That naturally brings up the matter of winter service from the system.

It was originally planned to have the system include a heater at the rear. This has been discarded in favor of letting the buyer make a selection from any of the standard car hot water or gasoline heaters. It has long been recognized that circulation of heated air is more effective. The blower thus can be utilized for such circulation and, in addition, filtered fresh air can be drawn in if needed, although the window ventilating system is usually sufficient for this purpose.

Air, whether heated or cooled, is returned under the rear seat and is circulated forward against the roof, thus reducing drafts to a minimum. Called the "evaporator assembly," cooling coil, air filter and blower occupy no more room than a 10-inch traveling case. Ample room is left for luggage, but you won't need so many changes of clothing when riding in the comfort of America's first weather conditioning on rubber tires.

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Niagara Falls has moved upstream seven miles in the past 20,000 years.

## New Planes Get Tape Test

[*Continued from page 86*]

flying, which sometimes totals $1,000 an hour.

The quarter-inch steel tape looks the same after the recording as before. No scratches, dots or other indentations appear on it, as on a phonograph record. There is merely a magnetic field on the tape and this magnetic field reproduces the voice or other sound. It will record up to 16 different sounds at the same time and there is no cross-talk between the lines.

The machine will record the vibration and noise itself, from which engineers detect flutter. The vibrations are recorded without use of microphone, but the voice is recorded by use of small mike that fits underneath the collar and is held against the outside of the vocal chords. This mike picks up the vibration of the vocal chords only and does not record engine noise or other sounds. It can be used while wearing an oxygen mask. Only the "S" sounds of the human voice are not picked up by this vibration type mike.

The same coils do the recording and the reproducing. It runs on either AC or DC and requires a current only for the motor. The message may be played right back, as no processing is required. This is a great advantage over a film recorder, which is very expensive and which requires considerable processing before the message can be played back. It is also a fire hazard, which the magnograph is not.

The control unit has a button for each sound track on the tape. There are two decks, upper and lower, each deck containing one steel tape that will pick up as many as eight separate messages simultaneously. As each of the two tapes may be used at the same time, the two tapes will record up to 16 separate recordings simultaneously.

The control unit is remote control, attached to the recorder by three cables. In a single seater plane such as the P-38 the remote control unit alone is placed in the cockpit. It weighs only 2 pounds and is about one foot square. The recorder, 75 pounds, is placed elsewhere in the airplane. The pilot presses as many buttons as there are separate sounds he wishes to record at the same time. He may use only one or two tracks, one only of course for his own voice, the multiple possibilities of the device being capitalized on more particularly in the testing of a bigger plane with several men aboard.

Attached to the control unit is a speedometer for checking the speed at which the tape passes through the recorder. This is important to know, so that the tape may be played back at the same speed at which it was recorded. It is usually set for 60 feet a minute, where it is possible to record speech better than at 30 feet a minute. At 30 feet a minute the machine will run for one hour and you may have 16 tracks for one hour or one track for 16 hours, or any combination. At 60 feet a minute you may have 16 tracks for one-half hour or one track for 8 hours, or any combination.

## Photo-Cell Phonograph

[*Continued from page* 83]

work of engineers of the Philco Corporation. The device eliminates the actual, mechanical work formerly done by the needle being dragged through the grooves of the record. The photo-electric cell made the idea practical.

In this invention, the needle has been replaced by a sapphire jewel which floats through the grooves on the record, transmitting the tone vibrations to a tiny mirror swinging freely on an axis. A beam of light, produced by a small bulb and directed at this vibrating mirror, picks up the vibrations and reflects them on a photo-electric cell. The cell, activated by the vibrating light-beam, converts these vibrations electrically into music.

In other words, the floating jewel of the photo-electric phonograph acts merely as a control valve to operate the photo-electric cell. Thus, the friction characteristic of the operation of former types of phonographs has been eliminated with the result of prolonged record life, running up to 1,000 playings of a single record.

The mirror in the photo-electric phonograph is of special glass as thin as paper, with a vaporized aluminum coating similar to that of the new 200-inch telescope.

The bulb had to be especially designed in order to be sufficiently small and light weight. No flash-light bulb was strong enough for the purpose. The one used in the photo-electric phonograph is filled with argon in order to provide a bright light and still not burn out quickly.

In qualities of sound reproduction, the new photo-electric phonograph is superior to anything previously attained. Its musical range completely covers all musical instruments.

## Enlarger For 6x9 cm. Cameras

[*Continued from page* 91]

The lower part of the lamp housing is a piece 4 in. long, cut from a 5-quart oil can. A reflector from an automobile headlight is soldered to the top of the can to complete this part of the housing.

The attachment that supports the lamp housing is from an upright floor lamp. It is necessary to cut a collar to fit inside this cup-like affair (see drawing), and around the socket to act as a light baffle. A piece of a small can is soldered to the top of the reflector to receive the socket portion of the lamp. Screw holes drilled in the small can match the screw holes in the extreme end of the socket portion of the lamp to hold the two together firmly.

An enlarging lamp of 100 watts can be used for lighting. The opal glass serves to diffuse the light efficiently and a perfect enlargement of 18x24 in. is possible on the baseboard when using 6x9 cm. film and a 10.5 cm. lens in your camera. The entire job will not cost more than three or four dollars.


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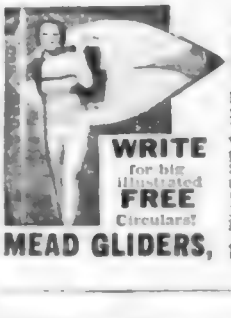
SEE PAGES 11—131



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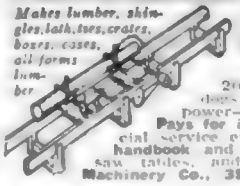

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# Future Motorists Learn Ropes

[*Continued from page* 87]

nature to the tots, things that will never be forgotten.

The idea behind Mansfield's program is that the children of pre-school age, though too young to profit from admonition and the printed rule, are just young enough to put those rules into practice through play.

A playground with a purpose does the trick. Safety Town, it is called, this miniature village of about 120 square feet, laid out with model buildings, model street crossing, safety signs and miniature stop lights that change on the same time schedule as real traffic signals.

Here at regular intervals throughout the summer you may find groups of from 50 to 100 children—future motorists—operating the project's twenty-five small, fascinating pedal-driven automobiles and absorbing the responsibilities that go with driving.

While some of these boys and girls pedal and steer the toy cars, the others take the equally important part of pedestrians. In this role they learn where and when to cross a street safely, how always to stop if the red light goes against them. At fifteen-minute intervals the two groups change places so that nobody gets tired or loses interest.

Sponsored by the recreation department of the city, Safety Town is shifted every two weeks during the summer to a different municipal playground, of which Mansfield has four.

The idea of Safety Town originated in the practical mind of Frend C. Boals, traffic policeman, back in 1937. Something of an expert in child psychology, Boals had long been impressed by the amazing ease with which a child learns anything that's really fun. How, then, to make a game of Safety? Suddenly the officer had an inspiration—and Safety Town was the result.

The kids didn't even have automobiles at first. They brought their own tricycles, scooters and other miscellaneous means of locomotion. But the idea went over so big with them right from the start that the Richland County Automobile Club pricked up its ears and promptly donated twenty-five miniature motorcars.

Has it paid? Reports show that in each of the years 1938 and 1939 traffic accidents among Mansfield's children were only half as numerous as in 1937, while the current year bids fair to cut these needless tragedies even more. Indeed, the whole city has become traffic-conscious from watching the experiment.

For all of which it is pretty safe to say that Traffic Policeman Boal's "brainstorm" was responsible. Safe, too, to assume that Mansfield is raising a crop of youngsters whose car driving will in time set an example of safety for the generation to come.

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In a television receiver pictures are recorded at the rate of 30 per second.

## Bonnie, 18-Ft. Plywood Sloop

[*Continued from page* 101]

simple as is commensurate with sound boat building, and ample sitting headroom is provided. A six-foot man can sit bolt upright on the bunks without braining himself, but nevertheless the height of the cabin roof is not out of proportion to the hull, and trimness of line has been retained. The wide hatch makes it easy to get in and out of the cabin, besides providing plenty of ventilation. When the hatch must be kept closed, the two working portlights in the front of the cabin will let air in. Two rectangular windows on either side admit lots of light and give good visibility from inside though they do not open.

The principal side supports are eight pieces of 1⅛x2¾-in. fir, four to a side. The back ones, at frame No. 4, are carried down to the floor frame and fastened to it with screws. The front uprights fit in the corner formed by the deck longitudinals and deck beam at frame No. 2 and are screwed to the beam. They do not extend below the deck framing. Two more uprights are screwed to the longitudinal at equal distances between the two ends. It will be necessary to slightly bevel the lower ends of these uprights so that they will stand straight, as the longitudinals will have an outward slant. The three aft uprights on each side are placed with the greater dimensions running lengthwise; the other one is set in, in the opposite direction and notched to receive the roof stringer.

The front panel of the cabin goes on next, after being cut to size and shape shown. Use 1¼-in. No. 8 screws to fasten it to the uprights. Next bend in the roof stringers, securing them to each upright with two 1¼-in. No. 8 screws. Cut the two back pieces with great care, and stand them in place. It is best to make a paper pattern of these, or take careful measurements inside your boat as the ends must be flush against the bottom and sides of the hull. Notch them for chines and sheer strips. When they have been fitted correctly, fasten them to the back uprights with the above-sized screws. Your cabin is now taking shape, and you will soon be ready to put in the roof carlins.

First, however, cut two more pieces of fir for door frames and screw them to the edges of the door opening. Run the screws from the plywood into the fir. It will be found that the bottoms of these door frames can be fastened to the floor

[*Continued on page* 150]


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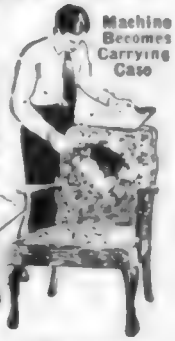


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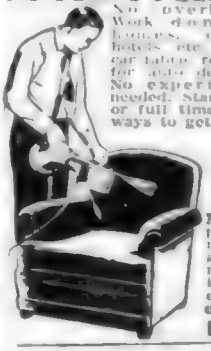

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## Bonnie, 18-Ft. Plywood Sloop

[*Continued from page* 149]

beam for extra strength. Cut the two fir end carlins and screw them to the plywood pieces, allowing the outside ends to rest on the uprights. The inside ends butt against the tops of the door frames. Now saw out the oak carlin which fits against the front panel, and fasten it in place with 1¼-in. No. 8 screws. The two central fore and aft roof supports of ⅞ x 2-in. oak come next, and are notched and screwed to the end carlins, as indicated in the drawing and photos. The cabin sides are of ½-in. Super-Harbord and continue aft to a point 6-in. beyond the cockpit to act as coamings or splashboards. The bottom edges should be snug against the deck all along and must be trimmed in a slight upward curve to attain this. After cutting a side panel to the proper length and approximate width and shape clamp it to the front of the cabin and bend it back along the deck until it is in position. Now place a pencil on top of a small block of wood and run it along the bottom of the panel, with the block flat against the deck. The correct shape has now been marked along the bottom edge, and may be cut accordingly. Screw the cabin sides to the framework, covering the screw heads with Kuhl's trowel cement as on the hull. Bend the extending ends around the edges of the cockpit and clamp temporarily in place.

The linings for the coamings may be made next. These are simply pieces of ½-in. plywood shaped the same as the outside coaming, but extending down inside the cockpit far enough to cover the deck framing. At the aft end of the cockpit the pieces are notched so the extremities will rest on the after deck alongside the coaming. Screw the pieces to the coamings and to the deck longitudinals, using ¾-in. No. 8 and 1¼-in. No. 8 screws, respectively. These pieces thus serve three purposes; they support and hold the coamings firmly in position, they neatly finish off the cockpit sides, and they are convenient back rests for the passengers. The window openings may be cut at this time or later, as desired.

The remaining roof carlins can be put in at this time, as shown. They are all ¾-in. sq. white oak and are bent into place, being notched *over* the fore and aft beams, and fastened down with one small screw at each joint. The outside edges are allowed to come out and butt against the cabin sides. (See cross-section drawing.) Soak all the carlins at least overnight before bending in, or steam them in a piece of pipe over the kitchen kettle if you prefer. Fasten the centerboard brace, which should be sticking up through the roof framing, between the third and fourth carlins (from the front) with a through carriage bolt, ¼-in. in diameter. Cut off the excess of the brace flush with the carlins. Cover the roof with ⅜-in. lauan faced (mahogany) plywood in three sections, with the joints meeting in the centers of the

[*Continued on page* 151]

# Bonnie, 18-Ft. Plywood Sloop

[*Continued from page* 150]

fore and aft beams. Paper patterns will be helpful here. The top edges of the cabin sides should have been previously beveled so the roof panels will be a snug fit all around. Fasten the roof with 1-in. No. 8 brass screws, turning them in flush with the mahogany. Fill the seams and treat in the same manner as the decks.

## Finishing the Cabin

By now your boat really looks like a boat, and you can get inside the cabin and feel that those sailing days are not far off. The outsides of the cabin are to be completed, which means adding doors, hatch and slide rails. A dimensioned perspective drawing shows the arrangement and procedure very clearly, so we will be brief in the description. Make the doors first, of ¾-in. plywood (lauan faced, if desired). They must have jambs to close against, but these must wait until after the motor beds have been installed. However, a strip must be fastened to the forward side of each aft trunk brace, projecting about ½-in., and these can be put in now. Fasten the slide rails to the cabin roof with 2-in. No. 10 screws driven from inside up through the fore and aft roof beams. The hatch cover is made as shown, with the hinged flap on the front coming down over the door top when closed, thus preventing rain from entering. A mahogany piece forms a projecting lip at the front end of the hatch opening, making it watertight and providing a stop for the hatch cover.

Construct the forward hatch cover also, following the sketch. Stain and varnish all exposed mahogany surfaces, if you have not already done so. Paint the outsides of the hull, cabin sides, front and ends with two coats of yacht white, flat. The entire inside of the boat should be given a priming coat of aluminum paint, followed by a coat of semi-gloss interior paint, of a desired color.

All the deck hardware, door hinges, rudder gudgeons, etc., may now be put on (see diagram). The bow and stern chocks, bow plate, lip leaders and hinges are screw fastened; traveler, mooring bitt, gudgeons and cleats are through-bolted.

***This concludes Part II of* Bonnie.** ***Next month we will install the motor, rudder, spars and rigging, complete inside of cabin and cockpit, and apply the finishing touches.***

**Large scale blueprints for *Bonnie* are available for $3.00. We can also supply FULL SIZED patterns of the stem transom knee, breasthook and frame gussets for $2.00, or a FULL SIZED body plan blueprint at $2.50. Order any or all of above by number, addressing Fawcett Publications, Inc., Greenwich, Conn., enclosing check or money order. All plans sent postpaid. Blueprints are No. 944; patterns No. 944A; body plan No. 944B.**

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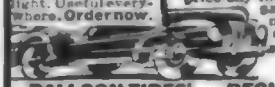

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| 31x5.25-21 | 3.25 | 1.35 |
| 6.50-17 | 3.35 | 1.40 |
| 28x5.50-18 | 3.35 | 1.40 |
| 29x5.50-19 | 3.35 | 1.45 |
| 6.00-17 | 3.40 | 1.40 |
| 30x6.00-19 | 3.40 | 1.40 |
| 31x6.00-19 | 3.40 | 1.45 |
| 32x6.00-20 | 3.45 | 1.55 |
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|---|---|---|
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|---|---|---|
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| 40x8 | 13.25 | 4.95 |

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|---|---|---|
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# Canvas Lined Trunk

[*Continued from page* 103]

Canvas lined centerboard trunk in new frame.

leakage. No dimensions are given here, except the thickness of board and trunk, as boat sizes vary. Ditto on the board's placement. A little comparison with boards in boats of similar size to yours will give you accurate enough measurements.

To build the trunk into an old boat, slot the keel and deck. CAUTION—Before cutting anything, outline where the cut will be and tack canvas closely *outside* this line, so the skin won't pull away when you cut it. If the trunk is too far forward of the cockpit, you may have to remove the deck canvas to get at the work properly.

Be sure slots are in line. Cut the deck first, then drop a plumb line to the keel, being sure your boat is braced level.

Fit the plywood trunk sides closely, and drill for screws. Screw sides to stringers from inside out. Don't forget to fit bottom edges of both trunk sides and stringers to the curve of the keel.

Then coat inside surfaces of trunk sides with white lead and stick canvas linings on. Should be good grade, 10 oz. duck. Allow plenty of overlap on top and bottom. Thin some white lead to consistency of heavy enamel and paint the canvas thoroughly, soaking it.

Now hold the trunk sides in place and pull the loose ends of the canvas through the slots. Force in the posts, which must be about 3/16" where they enter the slots, to allow for thickness of canvas. Put a generous amount of white lead in the joint of posts and keel.

When everything is in line, and the posts tight against the slot ends, screw sides to posts. Screw

[*Continued on page* 153]

## Canvas Lined Trunk

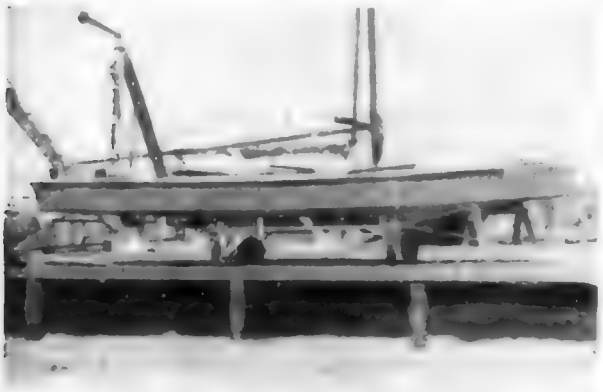
[*Continued from page 152*]

through frames into stringers, and through the kingplank into the top stringers.

Coat slot edges thickly with white lead and tack overlaps at keel and deck, pulling tight, and tacking with copper tacks ½" apart. For trim looks, screw a slotted coverboard to the deck.—*K. B.*

## A Simple 4-Wheel Boat Trailer

[*Continued from page 103*]



**The trailer carrying a small sailboat hull.**

The frame is an all-steel welded job, the chassis consisting of a rectangle of pipe mitred and welded at the corners and reinforced with steel gussets at each corner. The front wheels are on swivels, connected to a tie bar and towing bar, as shown in the perspective drawing. Rear wheels are mounted on a steel-bar axle that slides into a pipe spacer, as shown. This construction permits removing wheels for tire changing.

Cradle beams are of two or three-inch pine, depending on the weight of the boat to be hauled, and the forward beam can be moved forward or aft to accommodate the hull being served. Various shapes of cradles are made for respective hulls. The tie bar on the front wheels can be removed for easier handling when the trailer is being used on a dock.—*H. S.*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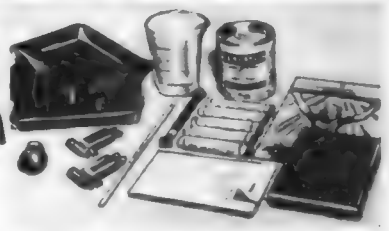

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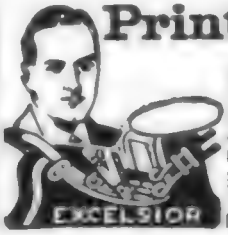


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# A Model Airplane Trailer

[*Continued from page* 114]

**The family car can be quickly converted into a model airplane trailer by the method shown above. A pine frame covered with chicken wire is tied to the car top to carry the planes. Be sure to put padding under the frame to prevent scratching the top.**

ance, as the wheels may simply be left exposed as shown. One of the best materials for the covering of the body is waterproof plywood. The various waterproof building boards, however, will serve nearly as well. In some instances even cloth is used, doped as in airplane construction. Although this saves weight and expense, it is not as strong or as durable as the other coverings mentioned.

White pine is the best all-around material for the framework, as it can be obtained at almost any lumber yard. If the trailer is to be towed by a bicycle, naturally an auto frame would not be used. In such a case the entire chassis could be constructed from pine.

In planning your trailer, it is somewhat less trouble, even though heavier, to use the rear axle of the car as the trailer axle. This eliminates the necessity for welding or pinning the steering mechanism in a neutral position. The driveshaft need merely be disconnected at the juncture with the differential.—*Harold W. Kulick.*

**A simple "box" type trailer of small size will conveniently serve smaller model clubs. This one was built of scrap lumber and mounted on a junk yard wheel and axle assembly.**

## A Lantern Humidor

[*Continued from page* 104]

Then fit the top of the jar into a small groove, ¼" deep. Reverse the piece on the face plate and finish the design for the top. Make the lid so that it fits closely into the top.

Drill three ¼" holes around both the top and bottom pieces. Cut three wooden dowels to hold the top and bottom together. The dowels are covered with thin wall brass tubing and capped at the top where they protrude a ¼", with small empty cartridge shells. A brass ring, 1½" in diameter is fastened to the lid of the humidor for a lid handle.

The wooden parts are then stained and finished with two coats of thin shellac, rubbed down and waxed. Incidentally, a 1" cube of apple placed periodically within the jar will improve the taste of your favorite blend and keep it moist.—*G. E. B.*

## "Pocketeer"

[*Continued from page* 113]

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2 sheets balsa ⅛"x3"x36"
2 sheets balsa ⅛"x2"x36"
6 strips ⅛" sq. x 36"
1 block 1"x4"x18"
1 block 1½"x7"x1"
4 oz. cement
4 oz. dope
3 ft. ⅛" wire
3 ft. 3/32" wire
2 pair wheels
1 pair motor mounts
5 ft. ignition wire
1 ft. .050 wire
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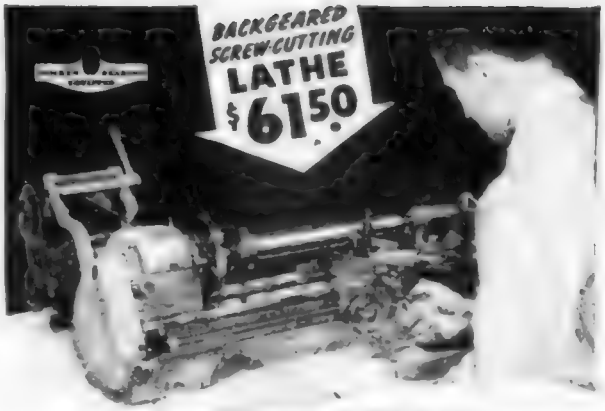
Full sized blueprints for the "Pocketeer" are available for $1.50 postpaid. Send check or money order to Fawcett Publications, Inc., Greenwich, Conn. Blueprint No. 323.

## Weather Bureau Kite

[*Continued from page* 121]

The four sticks are pine 36-in. long by ⅜-in. square. Tack the box cloths to the sticks to form boxes A and B. Then tack wings C and D, by their long edges, to two sides of the box assembly. The fourth stick should then be run through the two wing eyelets as indicated. Tack the wings to this fourth stick to prevent it bellying out and distorting the shape under a heavy breeze.—*L. B. R.*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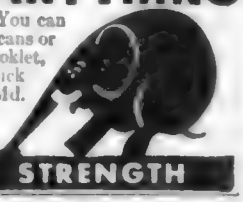

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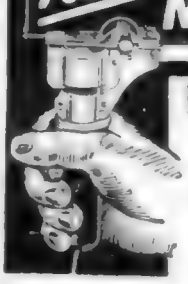

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# How To Clean Guns

[*Continued from page* 123]

## Metal Fouling Solutions:

Ammunition makers claim that today's products leave little or no metal fouling in rifle barrels. Yet certain loadings include bullets cased with cupro-nickel, and *at certain velocities*, these cupro-nickel jackets *will* leave deposits in rifle bores, though less than formerly. Metal fouling is bad, whether in the form of a thin plating over the bore, or built up lumps toward the muzzle. It may cover up chemical deposits which, unable to escape or be washed out, will eventually cause pitting. Since it's the last six or eight inches of a rifle's bore which directs the flight of the bullet accurately or otherwise, keep that bore *free* of all metal fouling, thin plating, lumps, or otherwise.

The solvent previously mentioned, if used religously soon after shooting, will do much in this direction; but sometimes, in spite of best efforts, the shooter will discover evidences of metal fouling. Go after it immediately, and it will be a "pushover." Let it stand, and it means a lot of hard work, with probable disastrous results.

METAL FOULING SWABBING SOLUTION:
(Whelen)

| | |
|---|---|
| Strong Ammonia, (26 to 28% gas) | 6 oz. |
| Ammonium Persulphate | 28 grains |
| Distilled Water | 4 oz. |

Shake thoroughly until the ammonium persulphate is dissolved. Prolonged swabbing with patches well moistened with this solution, (until patches come out clean, without greenish or bluish tinge) indicates that all "plated" metal fouling is removed.

AMMONIA "DOPE": (Whelen)

| | |
|---|---|
| Ammonium Persulphate | 1 oz. |
| Ammonium Carbonate | 200 grains |
| Strong Ammonia (26 to 28% gas) | 6 oz. |
| Distilled Water | 4 oz. |

Grind the ammonium carbonate thoroughly in a mortar with a little of the water, when dissolved, add the other ingredients. Put into a pint size brown bottle with ground-glass stopper. To use, slip a short length of rubber tube over muzzle of barrel; put a rubber stopper into breech—*tightly*. Pour solution into barrel until full; let stand half an hour to an hour, and pour out. Keep solution level in tubing above muzzle, as evaporation of solution at muzzle will rust barrel. If solution comes out very discolored, repeat, then swab barrel with swabbing solution given above.

Immediately following the use of any ammonia solution, barrel should be thoroughly flushed with clean boiling water, then oiled with any good standard gun oil or grease. Very light household oils are satisfactory if you apply them every day or so. They have no cleaning value, however, and will quickly evaporate if applied once and

[*Continued on page* 157]

# How To Clean Guns

[*Continued from page* 156]

forgotten. An excellent cleaning lubricant, well adapted to pistols, revolvers, and .22 calibre rifles shooting only lead bullets, is:

| | | |
|---|---|---|
| Spirits Turpentine,<br>Pure Sperm Oil,<br>Acetone | } | Equal Parts. |

Shake well together, and use as soon as possible after shooting.

A similar formula, by the famous Dr. W. G. Hudson, that has been recommended for many years is:

| | |
|---|---|
| Astral Oil (or Kerosene) tested and found acid-free, or freed of acid by the addition of lead shavings or Soda Bicarbonate | 2 fl. oz. |
| Sperm Oil, (pure) | 1 fl. oz. |
| Acetone | 1 fl. oz. |
| Spirits Turpentine | 1 fl. oz. |

Shake thoroughly, and use as a swabbing solution, soon after firing.

*Leading in barrel* usually results from shooting dry lead bullets not properly lubricated, or when the barrel has become overheated from rapid-fire target work. To remove leading, first swab bore thoroughly with boiling water and a little soap, to remove powder residue. Plug breech, fill bore half full of metallic mercury; hold finger over muzzle, and tilt barrel back and forth till lead deposits amalgamate with the mercury, which is then poured out. Swabbing bore with strong cider vinegar, or with acetic acid solution, may give equally good results. When lead fouling seems so firmly fixed as to indicate the need for mechanical action, use calcium phosphate mixed to a paste with water. It cuts lead, but "breaks down" on steel. You won't hurt the finest target rifle bore by swabbing with this. Substitute a thin lubricating oil for the water if you want to—it will get the job done, but take longer.

Cleaning a gun, without proper after-lubrication of bore as well as action parts, seems futile—and is, and not all lubricants, by any means, are adapted to firearms.

A good grease for all over the outside, and for action parts when gun is to be put away for a while is:

| | | |
|---|---|---|
| Anhydrous Lanolin,<br>White Petrolatum | } | Equal Parts. |

Melt together over a water bath, stir thoroughly until cool. Spread a thin layer over all working and exposed surfaces.

A splendid lubricant and protective for gun actions and all similar working mechanisms is:

| | | |
|---|---|---|
| Pure Sperm Oil<br>"Gulfoil" | } | Equal parts. Mix thoroughly. |

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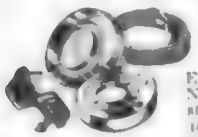

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# A Lighthouse Lamp

[*Continued from page* 126]

or light sheet metal, 9⅝"x10¾". For the arcs which form the base and top line it is best to lay out a pattern on a sheet of paper. Draw a long line for an axis and a shorter one at one end at right angles to the axis. On this shorter line mark the width, 9⅝", with the axis through its midpoint. Then, 10" further up the axis, draw another line at right angles to it, marking on it the upper width, 5¼". These points, connected by straight lines, form the straight edges of the pattern. By extending these lines to the point where they intersect on the axis you get the focal point from which to draw the desired arcs. By means of a piece of twine, a nail, and a pencil these arcs can easily be drawn. Mark off four ¼" projections along the base arc for fastening the completed wall to the lamp base. Also cut a half-inch hole near one edge of the metal for the switch button to protrude through, measuring the height according to the type socket used.

Bend the wall piece carefully around a piece of pipe to avoid kinks, and solder the seam, overlapping it ¼". File the soldered seam smooth.

The railing, Fig. 8, is cut from stiffer sheet metal, or the lighter stock, doubled. Bend ⅛" of the lower ends of the banisters at right angles, then round the railing and solder together. Cut out the metal ring, Fig. 9, for the floor and solder it to the upper sides of the bent banisters. Solder the assembled railing to the lighthouse wall.

This part is now ready for inserting the socket assembly. Tack the wall to the lower circular block and nail it through the four projections to the lamp's base. Bring the cord up in back and through a bakelite ferrule.

The beacon part is now cut out as in Fig. 4, laying it out as explained for the wall. Cut out the slots, 2"x⅜", with a small cold chisel and file the edges smooth. Round the piece and solder together, overlapping ⅛". Make up the upper railing I, Fig. 2, the same as the larger one, using measurements given in Figs. 5 and 6. The dome, J, Fig. 2, is the top of an old bicycle bell, 1¾" in diameter. If this is not available make a conical top. In either case fasten the dome on with solder. A ¾"-section of a large nail, slotted with a hacksaw, is soldered to the center of the dome and a ¾" weather vane is soldered into the slot.

This beacon assembly is removable from the wall section. It is more effective when lined with light blue-tinted paper, glued to the inside.

The keeper's house, Fig. 10, is cut from ⅝" stock. The roof is of tin, soldered together and fastened on with brads. The eaves overhang an eighth of an inch. The ¼"-square chimney is soldered on next and the house tacked to the lamp base beside the lighthouse.

The rocks are made of papier mache. Tear up some newspaper and soak it over night in water. Then work it through the fingers till thoroughly reduced to pulp. Strain the pulp through cheese-

[*Continued on page* 160]

## Projects For Profit

[*Continued from page 127*]

| | |
|---|---|
| Wood | .03 |
| Lacquer | .01 |
| Cellophane | .01 |
| Filler, if used | .00½ |
| | $0.22 |

This 22 cents represents your actual cost. If the box is to retail for $1.00, then your price to the retailer (such as the corner druggist, the department store, the ladies wear and other similar outlets) will be 60 cents. This leaves you 38 cents as gross profit. Out of this comes your labor—your time. You will find that the boxes can be turned out rapidly; that after you have turned a few you can turn them in around half the time it took to finish the first ones. Then too, if you sell the item direct to the consumer the profit is greater.

A good first run on these boxes will be a dozen. Instead of running one through from start to finish at a time, you take one step at a time. For instance. Let's say you have chosen figured gum for the boxes. Cut the rough blocks—12 of them—to 4" square and 2¾" high. Cut also 12 squares of ⅝" or ¾" thick stock 3½" square for the tops. Coat the bottom of each thick block with glue and cut 12 squares of white pine for the waste. Stack all of these together, weight the top firmly to press out surplus glue and let the glue dry.

You can rig up a jig to quickly mark the centers. Drill a hole nearly through the pine on these points to take the center screw of the lathe face plate. Screw one block onto the face plate and turn out the inside of the box to the depth and diameter shown. Make the diameter quite accurate. You need not worry about the screw showing because its end terminates in the pine block.

As soon as you have turned the inside, sand it smooth and wipe out with hot paraffine applied with a brush. Then rub with a cloth. This makes the wood attractive. You can also smooth down the outside of the block, cut off the corners with a band saw. Now unscrew this from the face plate and repeat with the next block.

When all 12 blocks have been turned inside and finished, turn a wood jig as shown with a slight taper, just the right size to make a snug fit for the boxes. Place one on it, then bring up the tail stock to hold the bottom of the box firmly and turn and sand the outside of the box to the design and dimensions shown. Then apply a good coat of clear lacquer, rub down lightly with steel wool when dry, and polish with wax. If the wood, such as walnut, is porous, apply a filler coat stained to the tone of the wood first. Let this set, then rub off at a good speed and put on the lacquer. The pine block waste glued onto the bottom is also cut off during this operation.

The lid for this box is turned from the stock mentioned above. A small hole should be bored half way through each to make turning onto the face plate screw, quick and easy. This lid is

[*Continued on page 160*]

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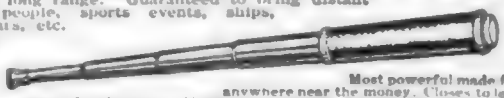

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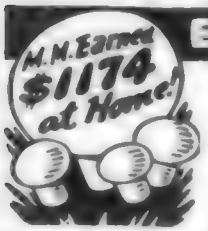


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# A Lighthouse Lamp

[*Continued from page* 158]

cloth and wring it quite dry. Now knead glue or flour-paste into it, to the consistency of soft putty and it is ready for modelling the rocks.

Partly insert about a dozen small nails into the base for reinforcement and model the rocks around these, pressing it in tightly.

When the papier mache has dried hard (after about 3 days) shellac and paint it. Gray or brownish red are realistic colors, with a tint of dull green, representing sea discolorations, around the lower edges.

The lighthouse itself is enamelled. Cream and dark green or buff and rich brown form attractive combinations. The keeper's house is enamelled to match. A piece of felt, glued to the under side of the base, serves to protect furniture against scratching.—*H. Skalla.*

# Projects For Profit

[*Continued from page* 159]

turned in a single operation, the screw hole extending up into the knob. The lid top must match the outside of the box in finish, but the under side may be paraffined.

So much for the powder box. The bath salts box has dimensions identical with the powder box, with these exceptions. The overall height is increased to 3½", the inside depth is increased to 3", the maximum diameter is increased to 4".

Poplar is an inexpensive wood, turns easily and takes maple stains so nicely that the result is unusual and attractive. If you use wood which may have been partly seasoned from a wood pile, remember to allow a little more play between box and lid than with wood which is fully kiln dried because there will be more shrinkage.

The total cost of the bath salts box should be no more and probably 3 or 4 cents less than the powder box and contents. Both should retail for the same price and many sales will be for the pair. One good talking point of course, is the use of the boxes long after the contents have been used.

The bottoms of the boxes need not be felted, but they should be sanded smooth and if you paste on a sticker carrying your name, or a coined name for your products, so much the better.—*D. V. H.*

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A Connecticut man runs a "hospital" for ailing radios, staffed with "diagnosticians and surgeons," and replete with hospital atmosphere.

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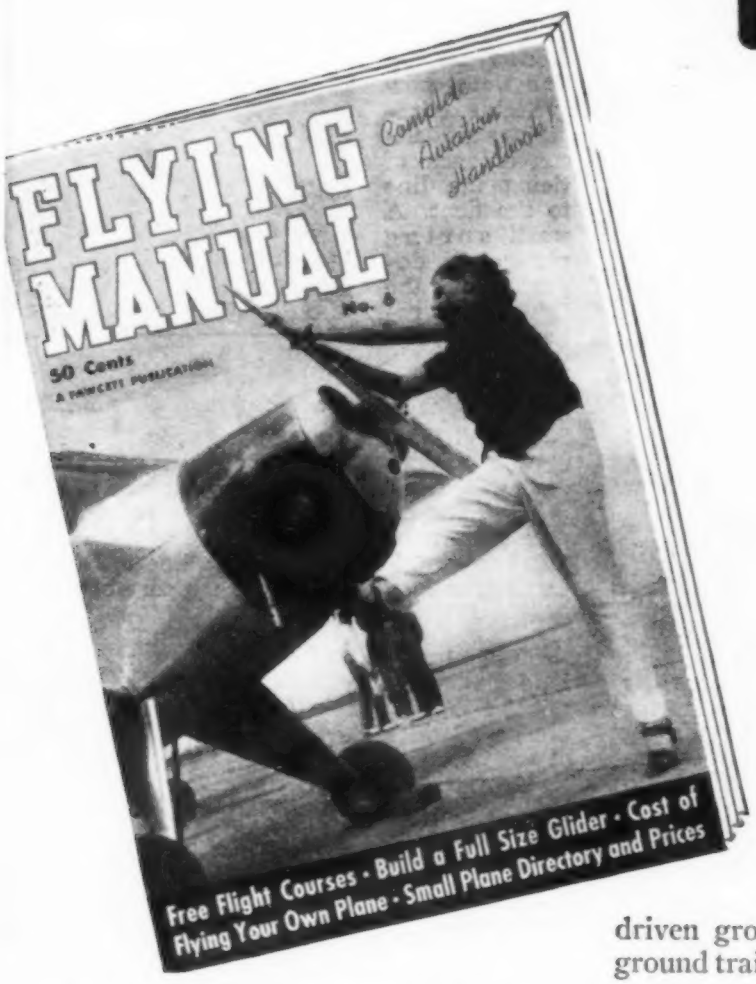


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**Business firms, educators and lecturers** will be interested in this new three dimensional projector recently introduced. The projector creates life-size pictures in natural color and gives the true depth of perspective normally seen by the eye. The projected pictures are viewed by the audience through special type polaroid glasses.

**A new fishing line float,** now available, eliminates the inconvenience of tieing the line to the float. A small spring plunger is depressed by the thumb to release an attaching hook on the bottom of the float, or bobber. The line is then strung over the hook, and the thumb pressure released. The hook is then drawn back into the recess on the bottom of the float body, firmly clamping the line to the bobber. The hook may also be seated outside the recess, on a brass disc, by giving the plunger a quarter turn. This permits the line to slide when casting, and still retain the support of the float.

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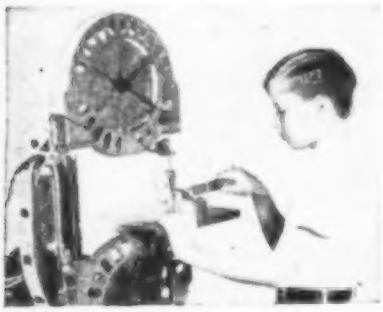

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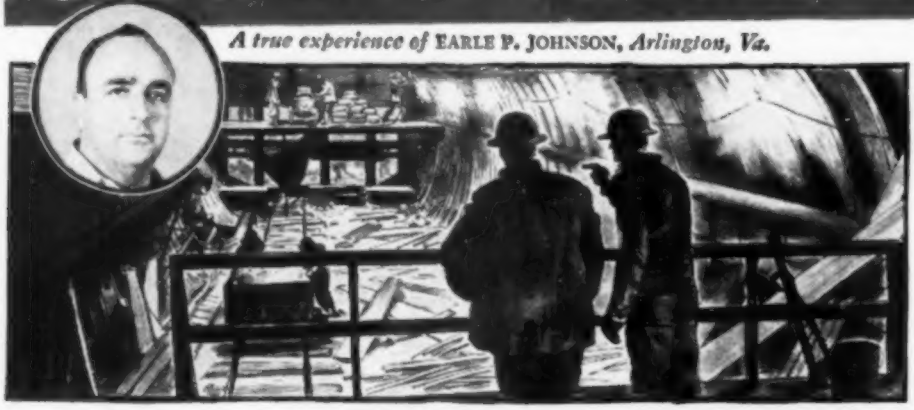

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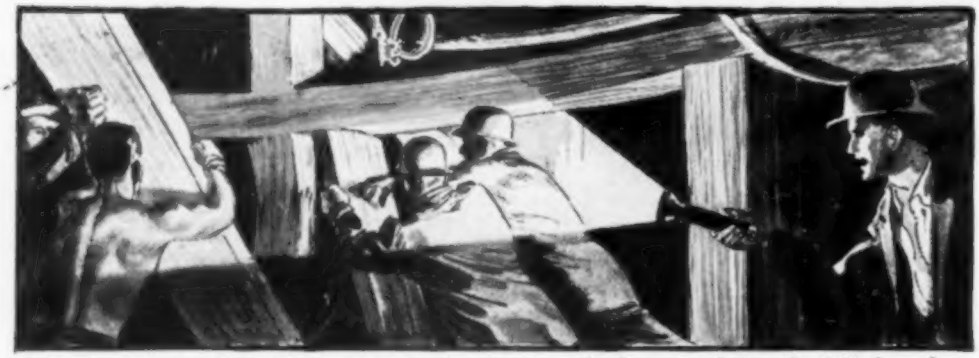

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